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SYMPOSIUM:
INTRA-CRANIAL COMPLICATIONS OF MIDDLE-EAR SUPPURATION.

Meningitis: Its Symptomatology, Diagnosis and Treatment, with Report of a Case.

By S. MAC CUEN SMITH, M.D., Philadelphia, Pa.

Symptomatology, Diagnosis and Treatment of Encephalitis and Brain Abscess.

By FREDERICK L. JACK, M.D., Boston, Mass.

Symptomatology, Diagnosis and Treatment of Sigmoid Sinus Thrombosis.

By JAMES F. MCKERNON, M.D., New York.

Pathologic Findings of the Intra-Cranial Complications of Middle-Ear Disease.

By THOMAS J. HARRIS, M.D., New York.

MENINGITIS: ITS SYMPTOMATOLOGY, DIAGNOSIS AND TREATMENT, WITH REPORT OF A CASE.*

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The clinical picture of meningitis was well known to the physicians of antiquity but, owing to a lack of anatomical study, it could not well be differentiated from other diseases of the brain. These studies were begun and completed in the middle of the eighteenth and, in the main, at the beginning of the nineteenth century. Robert Whytt, of Edinburgh, in 1768, was probably the first to clearly differentiate the clinical picture; and he described a number of cases in children of acute diseases of the meninges which coincided quite accurately with our knowledge of tubercular meningitis. By suc-

* Read at the Meeting of the American Laryngological, Rhinological and Otological Society, held at Boston, June 5 to 8, 1905.

ceeding study, particularly on the part of the French and German investigators, the pathologic anatomy and symptomatology were developed to the point at which we find them today. In comparatively recent times, attention has been chiefly directed to the bacteriologic origin of the disease. The tubercle bacillus, after its discovery by Koch, was readily proven to be the pathologic agent of tubercular meningitis, and quite a number of other micro-organisms were found in meningeal exudates and the cerebro-spinal fluid. Among these the diplococcus intracellularis meningitidis and the pneumococcus play the most important roles. The diagnosis of the affection has been greatly facilitated by Quincke's ingenious invention of lumbar puncture. This method has not only been of value in diagnosis, but in the treatment of the condition as well.

Clinically, we distinguish between epidemic, suppurative, tubercular and serous meningitis. Meningitis from aural disease differs from that due to other causes chiefly in that the symptoms are more severe and may be relieved by operation. Jansen states that pachymeningitis externa purulenta is the most common variety. It occurs twice as frequently with chronic disease of the tympanum, as it does with the acute form. In this variety of meningitis, a large proportion of the cases are insidious and without symptoms aside from those of the ear; and therefore, it is not discovered until after operation; but, on the other hand, it may begin with a chill and fever. Localizing symptoms are rare. Extension to the meninges may take place in one of three ways; (1) through carious opening in the skull, (2) through the natural communications, viz. the cochlea and semicircular canals, and (3) the infection may travel along the blood vessels and connective tissue. The cerebrum is affected when extension occurs through the roof of the tympanum; the cerebellum when it travels through the inner wall or the labyrinth. The most common mode of infection is either through the inner wall of the mastoid or through the roof of the antrum or tympanum. Jansen states that chronic aural disease affects the posterior fossa twice as often as the middle, and that acute aural suppurations affect the posterior fossa almost exclusively.

Leptomeningitis often occurs with sinus phlebitis, brain abscess or pachymeningitis; but it is usually complicated only by encephalitis. This latter occurs in two forms; (1) the apoplectiform, which is fatal in from a few hours to three days, and (2) the insidious form, lasting from two to three weeks. Diagnosis of the latter is very difficult until serious disturbances of the sensorium have presented themselves. According to Macewen, leptomeningitis may occur without any visible tract along which the inflammation has traveled.

In these cases the infection has been carried by the vascular system. Acute processes less frequently extend into the interior of the skull because the mucous membrane of the tympanum remains intact, but when this complication does occur it is due to the fact that the process has been sufficiently acute to cause thrombosis of the vessels.

Macewen further gives the mode of extension from the tympanum in chronic cases as follows; caries of the tympanic cavity does not usually effect the bone equally on each side, but extends in certain directions. When the roof is attacked by the ulcerative process, a perforation is likely into the middle fossa of the skull. This osseous ulceration may go on for some time and perforation may occur only after some injury has been received upon the skull in that region. Suppurative leptomeningitis of the basal ganglia and cerebellum may occur from extension along the sheaths of the facial and auditory nerves. The cochlea and semi-circular canals, being surrounded by harder bone, are seldom attacked, although they may be in the tubercular variety and following this a tubercular meningitis may be set up. Osseous ulceration may occur either in the carotid canal or in the roof of the jugular fossa. The most frequent points of perforation are the tegmen over the tympanum or antrum and the sigmoid groove. When the dura is exposed by these perforations, it throws out granulations to protect itself and assist with the absorption of disintegrated bone. This granulation tissue, when seen through the external auditory canal, may be mistaken for an aural polyp and removed with a snare, thus setting up an irritation which will produce a meningitis.

Meningitis serosa is a form of meningitis which can be distinguished from other varieties only after it has suddenly cleared up, either spontaneously or following operation.

Barker expresses himself as being of the opinion that hardly one-tenth of the intracranial complications of aural disease are brain abscesses and that more than nine-tenths are made up of meningitis, septic phlebitis and pyemia.

Meningitis manifests itself in a Protean manner. Occasionally the symptoms are so typical that it is impossible to mistake the affection; and, at other times, they develop in such a latent form that only with the greatest difficulty and by the most careful attention to the etiology can a tentative diagnosis be made. This explains why, at the autopsy, the serous membranes of the brain are so often found involved when such a condition had not even been suspected intra vitam, and, on the other hand, why the membranes are found pale and glistening in some cases in which the most marked cerebral symptoms have accompanied the affection. Since the disease, as a

rule, represents a diffuse affection of the surface of the brain, it produces general symptoms; and, as in the preponderance of cases, certain portions of the cortex are implicated, or the affection is propagated to the cerebral substance, focal symptoms also develop. The diagnosis, therefore, necessitates the proper appreciation of both of these groups of phenomena. The general symptoms which may precede or accompany the focal symptoms are headache, fever, vomiting, slow pulse, respiratory disturbances, jactitation, epileptiform convulsions, general hyperesthesia, delirium, involuntary discharge of urine and feces, and phenomena which are almost focal, such as tetany, grinding of the teeth, rigidity of the extremities and retraction of the muscles of the neck.

Headache is the most constant symptom. It is due to pressure upon the dura, to inflammatory edema of the brain substance, or to an accumulation of fluid in the ventricles. It is always decided, and while the patient is conscious his most persistent complaint is of excruciating and tormenting headache. Even when in a comatose condition we often note that the patient grasps his head with his hands. Only in exceptional cases is headache absent or even less intense.

Convulsions and muscular twitchings are prominent. The muscular twitchings may assume the form of epileptiform convulsions; delirium is common, and, particularly in children, a peculiar cry with which they sometimes start from their coma, is characteristic; it has been called the hydrocephalic cry.

The pulse, especially at the onset of the disease, is slow and this is all the more significant when fever is present; in the later course of the affection, the pulse becomes more frequent, irregular and smaller. The temperature fluctuates markedly, varying between 101° and 106° F. The respiration is early influenced; it is increased in frequency, sighing, and finally becomes intermittent and may assume the Cheyne-Stokes type. Vomiting is common and shows the peculiarity that it is most prone to occur when the patient assumes the upright posture. As a rule, it is not accompanied by nausea and often, with quite persistent vomiting, the tongue is observed to be clean. Vertigo is also a frequent symptom. Occasionally there is inability to swallow. Contraction of the pupil is often very decided. The latter is probably a spastic myosis, due to an irritation of the cortical origin of the oculo-motor nerves.

A symptom which is almost invariably present is painful contraction of the muscles of the neck. This often confirms the diagnosis and is produced by an irritation of the nerve supply of the muscles of the neck and particularly the spinal accessory nerves. Phenomena belonging to the same category as the rigidity of the muscles of the

DIFFERENTIAL DIAGNOSIS.

MENINGITIS.	BRAIN ABSCESS.
	PAIN
Pain is an early, severe and presistent symptom. Generally frontal and extends towards the vault, although it may be localized and correspond to the affected area.	Onset marked by sharp, severe pain in ear, which extends over side of head and developes into excruciating head pains, increasing on pressure or percussion. It does not disappear as long as patient remains conscious.
	TEMPERATURE
The fever in this condition does not attain a great height, nor is it characteristic.	Temperature is at first high,—then drops to normal or subnormal and so continues until abscess ruptures, which is followed by a rise.
	PULSE
The pulse is in the majority of cases very rapid, but, if there is local pus formation, it will become slow.	In early stages pulse is rapid, but after 2nd or 3rd day becomes very slow and again in the final stages increases greatly in rapidity.
	RESPIRATION
The breathing is very short and rapid and takes on the Cheyne-Stokes variety.	Breathing here is very slow, deep and stertorus.
	RIGIDITIES
Rigidity of the muscles of the back of the neck and retraction of the head usually accompany meningitis. There may be convulsions with loss of consciousness to a greater or less degree.	May be local rigidity of certain groups of muscles in the extremities.
	CHILLS
Sensations of chilliness and shivering are present, but not to a marked degree, although the onset may be shown by a distinct chill.	Rigors present to about same extent as in meningitis.
	GASTRIC DISTURBANCES
Vomiting is almost invariably present. It is of the cerebral type and does not depend upon the taking of food. The accompanying digestive symptoms are constipation, and anorexia.	Vomiting of same character, but more severe and persistent. Digestive disturbances are likewise sympathetic and abdomen may be retracted.
	OCULAR SYMPTOMS
Optic neuritis is not uncommon, but cannot be depended upon as a symptom of value.	Almost invariably present. In early stages photobia, later inequality of pupils with dilatation on affected side. Neuritis common in later stages. Very frequently lids do not close entirely and eyeballs roll upward.
	NERVOUS SYMPTOMS
Dizziness may be present in the early stages. The patient is extremely restless and often lapses into an excited delirium.	Drowsiness and slowed cerebration. Dizziness is usually present, being especially marked in abscess of cerebellum.
	COURSE
It may end fatally in three or four days, or it may last for two or three months. The average case is probably about two weeks.	Abscesses usually continue for from 2 to 3 weeks, but may extend over longer periods. Death comes on by coma unless in later stages it is complicated by meningitis.

DIAGNOSIS.

CESS.	SINUS THROMBOSIS.
p, severe pain in ver side of head excruciating head pressure or per- disappear as long nscious.	Pain is produced in this condition by pressure or percussion over the posterior part of the mastoid. This may extend down the neck along the course of the jugular vein. Headache is generally present but is not characteristic.
TURE	
high,—then drops al and so contin- ures, which is fol-	Fever is very high, with great oscillations, ranging between 100°-102°F. and 105°-106° F.
E	
s rapid, but after nes very slow and stages increases	Here the pulse is exceedingly rapid and as the condition continues it becomes very small and weak.
TION	
y slow, deep and	Respirations in this condition are not affected.
IES	
of certain groups extremities.	Rigidity is not, as a rule present in uncomplicated cases.
S	
ut same extent as	Chills in this condition are very severe and are frequently repeated and may be of one-half hour duration. They are followed by profuse prespiration.
URBANCES	
aracter, but more nt. Digestive dis- se sympathetic and racted.	Vomiting in this condition is generally present in the early stages, but is not severe. The tongue is dry and heavily coated and there is severe diarrhoea. These symptoms somewhat simulate enteric fever except that headache is more severe.
MPTOMS	
resent. In early inequality of pu- on affected side. later stages. Very not close entirely ward.	No special ocular phenomena.
YMPTOMS	
owed cerebration. present, being es- abscess of cere-	Dizziness is not infrequently found. The intellect is not as a rule interfered with except in complicated cases.
SE	
tinue for from 2 to extend over longer es on by coma un- s it is complicated	This condition usually terminates in from two to three weeks, although the period may be much shorter. Death is usually due to pyemia or metastatic abcess of liver, lung, kidney or brain.

neck are trismus, grinding of the teeth and spastic contraction of the abdominal muscles. The latter condition gives rise to the scaphoid retraction of the abdomen. Rigidity of the muscles, particularly of the extremities, and convulsions restricted to definite portions of the body are common symptoms. Hyperesthesia of the skin and muscles must be grouped with the most important diagnostic phenomena. This is particularly noticeable in the muscles of the neck and of the calves. The reflexes are at first increased, later decreased and may finally disappear altogether towards the end of the disease. The presence of Kernig's sign has, in recent years, been included among the symptoms of meningitis, although its value should not be overestimated, as it is sometimes absent in well-marked cases of meningitis and is occasionally found in other conditions. Trophic and vasomotor disturbances in the skin are sometimes met with, and among eruptions herpes is the most common.

Constipation is the rule; later in the course involuntary evacuations occur. The urine is excreted in small quantities and sometimes contains albumin. Sugar has been demonstrated in a few cases and, by some authors a remarkable increase in the amount of phosphoric acid has been noted. Extreme emaciation, often very rapid, is common, and is probably due to the cerebral effect upon the processes of metabolism.

The focal symptoms relate to paralysis of the motor area; occasionally monoplegias and hemiplegias are observed. Motor aphasia is not infrequent. As soon as the meninges in the neighborhood of the optic nerve become implicated, the clinical picture of optic neuritis develops.

The symptoms naturally vary according to the principal situation of the meningitic inflammation. The convex portion of the brain is generally affected by suppurative disease, while basilar meningitis is much more likely to be of a tubercular nature. It must not be forgotten that the spinal meninges are in many cases involved with those of the cerebrum, so that symptoms referred to the spinal cord are superadded to those developing from the brain. Suppurative meningitis is most commonly produced by contiguity, by way of the lymph-vessels or of the veins, and is due to caries of the petrous portion of the temporal bone and purulent inflammations of the middle ear. It may also be due to purulent catarrhal inflammations of the frontal sinus, operations upon the nose, the orbits, or in the aural cavity, to trauma, particularly fractures at the base of the skull, to wounds, to furuncles and to abscesses of the scalp.

The accompanying table for differential diagnosis between meningitis, brain abscess and sinus thrombosis, compiled mostly from Barr, is interesting in this connection.

As to the treatment, apart from employing general methods, such as the use of rest and the applications of cold, very little can be accomplished. Surgical interference is naturally indicated in most cases of meningitis complicating aural disease. This procedure, however, is satisfactory only in a very small percentage of cases, chiefly from the fact that the serious nature of the ear disease is not recognized until the meningeal inflammation has become well established.

Some authorities claim that *all* cases of *infectious* meningitis terminate fatally. The writer's experience would not only seem to confirm this observation, but also to establish the belief that cases which recover after operation are those which should have been termed "meningeal irritation" rather than cases of true infectious meningitis.

A recent addition to our therapeutic resources is the operation of lumbar puncture. According to Quincke, the inventor of this method, the operation is indicated in the following conditions:

1. In cerebral pressure, with threatening symptoms, where it is desirable to relieve the pressure.
2. In moderate, long-continued pressure.
3. In conditions in which increased pressure is assumed or suspected.
4. In cases in which it is desirable to examine the cerebro-spinal fluid independent of the cerebral pressure and thus obtain an opinion as to the nature of the meningitis.
5. In cases in which the fluid is to be examined for diagnostic purposes (blood, toxins, agglutinins, etc.)
6. For the purpose of injecting fluids into the spinal canal as therapeutic agents.

In the treatment of meningitis, lumbar puncture is employed largely for the purpose of relieving pressure, and in some cases of non-infective meningitis, uremia, etc., actually startling results have been reported.

The writer's own experience leads him to believe that lumbar puncture is of value chiefly as a means of diagnosis. The cerebro-spinal fluid has a normal specific gravity of about 1.010 and contains little or no albumen. In meningitis, the albumen is greatly increased, while in cerebral abscess it is only slightly increased. It is claimed that the presence of more than one per cent is pathognomonic of meningitis.

The history of one case which I desire to report is as follows:

A. S., female, white, aged 6 years. Three years ago the child had an attack of pneumonia, complicated by an acute suppurative otitis

media involving both ears. The discharge ceased in about two weeks.

Six weeks previous to admission to the hospital, the patient became peevish and irritable; complained of pain over the eyes, in the frontal region, and in the right ear. After three weeks of more or less severe pain, a spontaneous rupture of the right membrana tympani occurred, relieving the aural pain, which, however, exerted no favorable influence upon the suffering referable to the frontal and occipital regions. Prior to, or immediately following the appearance of the suppuration, the attending physician noticed some tenderness and swelling over the mastoid region; this however, subsided within a day or two so completely as not to attract any further attention.

Following irrigation, the discharge ceased at the end of one week. By this time the headache had become general, the pain being especially severe in the occipital region and the neck.

On admission the temperature was 103° F., pulse, 120; respiration, 24. The child was drowsy, stupid, and not easily awakened. Examination of the right ear failed to disclose any discharge or other evidence of tympanic or mastoid disease except slight redness and bulging of the superior and posterior wall of the canal. Traction on the auricle or pressure over the mastoid failed to elicit any outcry or other evidence of pain. The patient rested quietly that night and during the ensuing day; but, on the second night, she became restless and started up from time to time with a shrill scream, relapsing into stupor. This condition persisted for most of the second day, when the patient became more quiet, but developed marked rigidity of the muscles of the neck with strong retraction of the head. Marked and almost continuous twitching of both arms and legs now became prominent symptoms, as well as involuntary evacuation of bladder and bowels.

In this condition, the writer saw the patient and advised an immediate mastoid operation, his diagnosis of mastoid involvement being based on the history of the ear having previously discharged, more especially, however, upon the characteristic drooping of the superior and posterior wall of the canal. The cortex was somewhat harder and thicker than usually encountered in a child of her years. The tip was not involved. Neither pus nor other inflammatory debris was found until the antrum was reached. A small carious opening through the roof of the antrum exposed a moderately inflamed and pulsating dura. The radical operation was performed, but no evidence of further intracranial involvement was discovered. For two days following the operation the patient improved only in one respect, namely, the reduction of the temperature by two or more

degrees. However, on the third day after operation the patient sustained a gradual rise of temperature, starting at 103° F., at two a. m., reaching 107° F. and a fraction by eight p. m., when death relieved her suffering. The moribund condition of the patient was so far advanced that little or no anesthetic was required. The post-mortem findings would have been interesting, but unfortunately an autopsy was refused.

In conclusion, the writer would strongly urge on the part of the medical profession a more careful and better conception of the serious complications that frequently develop from diseases of the tympanic cavity that are regarded, from the symptoms presented, as simple in nature.

All suppurative processes of the organ of hearing should be considered a menace not only to the health but actually to the life of the individual thus afflicted. The importance of this doctrine is not in the least lessened from the fact that we see many cases of otorrhœa that have persisted for years without having caused appreciable harm. The ultimate outcome of many such cases is too well known and appreciated to admit of any controversy. After all, the most reliable treatment for meningitis complicating aural disease, and other intracranial lesions from the same cause, is to promptly recognize and properly treat the initial ear disease.

SYMPTOMATOLOGY, DIAGNOSIS AND TREATMENT OF ENCEPHALITIS AND BRAIN ABSCESS.*

BY FREDERICK L. JACK, M.D., BOSTON, MASS.

The term encephalitis seems to have several distinct meanings. In the first place there is the so-called polio-encephalitis superior and inferior in which the cranial nerve nuclei of the pons and medulla respectively are destroyed either suddenly (acute polio-encephalitis) or gradually (subacute and chronic polio-encephalitis). With this form allied to polio-myelitis or infantile paralysis otologists have little to do.

In the second place there is the acute exudative encephalitis (hemorrhagic encephalitis) described by Dana[1] as following influenza, cerebro-spinal meningitis, typhoid and other infectious fevers. This apparently never results in suppuration.

Thirdly and of special interest to otologists comes the acute suppurative encephalitis, a term synonymous with cerebral abscess.

This form of encephalitis and end result of the extension from the ear cavities of pyogenic micro-organisms either directly, or along the blood vessel, furnishes together with meningitis, a diffuse result of similar infection, the principal cause of fatal outcome in the cases with which we have to deal.

Dana states that abscess occurs oftenest between the ages of ten and thirty and this corresponds with my experience. I have tabulated according to the age of onset forty-three cases occurring at the Massachusetts Charitable Eye and Ear Infirmary, the Boston City Hospital and the Massachusetts General and find that thirty-two cases occurred between ten and thirty and eleven between thirty and sixty.

Prior to the appearance of Macewen's[2] treatise, the subject of suppurative infection of the meninges and brain, resulting from disease of the middle ear, had not received the systematic attention it deserved, though many cases had been reported, and the subject of brain abscess had been by no means neglected in the literature. This is not surprising in view of the universally hopeless prognosis of these conditions, both with and without operation.

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* Read at the Meeting of the American Laryngological, Rhinological and Otological Society, held at Boston, June 5 to 8, 1905.

1 Text Book of Nervous Diseases, William Wood & Co., N. Y., 5th edition, page 413.

2 Pyogenic Infective Diseases of the Brain and Spinal Cord, by William Macewen, M.D., Glasgow. New York: Macmilan & Co., 1893.

A new impetus to the study and a fresh incentive to operation were aroused in 1893 by the work of this author, whose elaborate presentation of the subject from the pathological, symptomological and operative point of view, placed it for the first time on its proper plane, whether regarded from the scientific or from the purely practical standpoint.

The increasing interest in this subject as well as the improvement in prognosis appears from the statistics gathered by various writers. Up to 1889 von Bergmann[3] found only eight successful operations on brain abscess of otitic origin; up to 1894, Korner[4] had collected only 55 cases of operation both successful and unsuccessful; in the following year he had increased this number to 92. In 1898, Marsch found reports of 60 successful operations upon temporal and 12 upon cerebral abscess.

The prominent symptoms of brain abscess are headache and vomiting, with normal or subnormal temperature in uncomplicated cases, slow pulse, progressive mental deterioration, mental dullness passing into apathy and eventually into coma, preceded or accompanied by convulsion. Pupillary changes, ocular paralysis and optic neuritis may appear, the latter less frequently than in tumor. Hemiplegia sometimes completes the picture, and generally denotes extension from the temporal lobe inwards upon the internal capsule.

The usual seat of abscess is in the tempero-sphenoidal lobe over the tegmen tympani, and in this direction the exploratory operation proceeds unless definite symptoms of cerebellar disturbance point to invasion of that organ. Such symptoms following ear disease demand prompt surgical interference. It is true that in rare instances a small abscess may be absorbed, or a large one near the surface may discharge spontaneously, but this chance is too remote to justify expectant treatment.

The case which forms the basis of this communication is sufficiently important to place on record as showing the possibilities of operation even upon a moribund patient. It further shows that trephining over the squamous portion of the temporal bone is not always necessary for the evacuation and complete discharge of the abscess and removal of all symptoms. This point is of practical interest in view of the following conclusion of Macewen[5] with regard to the operation through the tegmen tympani: "Such an opening into the cerebrum suffices for temporary purposes, but though it always ought to be made in order to eradicate the source of the infection, it is not safe to trust to it alone, as in many cerebral ab-

3 Die Chir. Behand. v. Hirnkrank.
4 Cited by Miller, *Deutsch. med. Wchnschr.*, 1897, vol. xxiii, p. 842.
5 *Deutsch. med. Wchnschr.*, 1897, vol. xxiii, p. 333.

scesses there are sloughs of brain tissue which can not be easily removed in this way, but require a larger opening in the skull for their evacuation."

From the symptomological point of view it is hoped that the detailed examination of the speech defect in this case will be of interest, since Macewen states careful reports are lacking of the variety of aphasia accompanying this disease though its occurrence has been noted.

J. W., newspaper reporter, married, 25 years old, of Boston, presented himself at the clinic of the Massachusetts Charitable Eye and Ear Infirmary July 31, 1901.

History. The left ear had troubled him for three years. There was a discharge last winter which ceased up to six months ago, when it reappeared. During the last six weeks, he suffered with frontal headache but there was no pain in the ear until two days before admission to the Infirmary, when he awoke from a sound sleep with a severe headache.

Examination showed a small amount of pus in the auditory canal. The walls of the canal were slightly swollen, but not especially tender to pressure. Landmarks of the drum membrane were obscured by swelling. The posterior segment of the drum was red and bulging. The mastoid was tender to touch over the tip and antrum, but not swollen.

The hearing tests were as follows: Watch not heard; the hearing for the voice was reduced about one-half. The tuning-fork by air conduction was only head one-twelfth of the normal time (T. F. 512 V. S. A. C.—20″ heard 1″). Bone conduction was normal (B. C.—10″ heard 10″). Tuning-fork applied to the skull was heard louder in the affected ear (Weber F. 256 V. S. louder in the left ear). The test by Galton's whistle was normal. The low tuning-fork was not heard (V. S. 192).

Severe headache appeared in a few days. The mastoid tenderness, however, gradually disappeared and also the swelling in the canal. The temperature fell from 101° F. on August 1 and remained at 99° F. for several days. The pulse during this time varied between 60 and 70. On August 7, seven days after opening (paracentesis) the drum membrane, the patient had a chill and complained of intense frontal headache. The temperature quickly rose to 102° F., pulse 90. There was no tenderness over the mastoid. Operation was advised and accepted.

Extradural Operation. Under ether, the usual mastoid incision was made and the periosteum was divided. A deep opening was necessary through sclerosed bone the entire distance. The antrum

was found filled with pus. On enlarging the opening above, and posteriorly, softenend bone with granulations and purulent matter were found. With chisel and curette, the bone was removed from the middle fossa for over a distance of 1 inch in length, and a half inch in breadth. The lateral sinus was also exposed about an inch. This was necessary in order to throughly remove all diseased parts.

The dura was normal in color and without bulging. The wall of the sinus showed nothing abnormal. The neck of the antrum was enlarged and the middle ear carefully curetted, removing the incus together with masses of cholesteatom. The wound was irrigated with a bichloride solution (1 to 3,000) and sterile water and dressed in the usual way.

Bacteriological Report. Mixed infection.

For a few days after the operation the patient's symptoms improved. The temperature on the following morning was 100° F., and pulse 80. The wound was dressed daily and looked well. He complained, however, of severe headache (frontal). The ice bag and repeated doses of codeia afforded some relief.

August 16, at 4 a. m., on the eighth night after the operation, the patient was found pulling and pushing the bedclothes and could not be roused. The pupils were equal and contracted, but reacted to light. Temperature 98° F., pulse 102, thin and wiry. Convulsions soon appeared in the hands and arms. The temperature suddenly rose to 103° F., and the pulse fell to about 60. The patient was perfectly quiet and deeply comatosed for four hours before operating. Perspiration was profuse, and the urine was passed involuntarily.

Intradural Operation. The wound was reopened and enlarged by an incision upwards over the squamous bone and posteriorly for about 2 inches towards the occipital protuberance. The skin and periosteum were retracted so that the skull above the mastoid was fully exposed. With chisel and rongeur forceps, bone was removed so that a larger surface of the middle cranial fossa was exposed than at the previous operation.

There was bulging outwards of the dura most marked over the tegmen tympani. No opening could be found in the dura. A hypodermic needle was passed twice upwards into the brain before pus was drawn into the syringe. A narrow knife was then entered at a point over the tegmen and passed upwards about 1 inch into the brain following the direction taken by the needle. The opening was enlarged by forceps and over 4 oz. of foul pus and sloughing brain tissue were evacuated.

The abscess cavity was thoroughly irrigated with a solution of carbolic acid (1 to 40), then one of bichloride (1 to 3000). After

all necrotic material had been removed, the dural wound was wicked with a small piece of iodoform gauze. The wound over the skull was partially closed by sutures, and the cavity of the mastoid covered with thin rubber sheeting packed with plain gauze and dressed.

August 17.—The temperature rapidly fell to 99° F., in 12 hours, and the pulse ranged between 60 and 70. The patient was quiet during the night and seemed rational at times. Answered when asked if he had any pain. The wound was dressed, and upon removing the wick about one-half ounce of fetid pus discharged from the abscess cavity in the brain. The cavity was washed out and dressed.

August 18.—The patient recognized his attendants this morning. Temperature 100° F., pulse 75. The wound was dressed daily, and every possible care taken of his general condition.

August 22.—During four days the patient had complained of headache (frontal). The temperature varied slightly between 98° and 99° F., pulse good. He had been less rational, and at times was roused with difficulty. The discharge of pus from the abscess cavity was becoming less in amount, and the brain was found somewhat bulging into the mastoid wound.

Examination of the Eyes. Pupils react normally to light. No hemianopsia. With homatropine the fundus of the right eye showed a slight swelling of the disc and tortuosity of veins, the left eye marked swelling of disc and tortuosity of veins. There was paralysis of left abducens muscle (eye would not rotate outwards beyond the median line). The patient stated, however, that the left eye had always turned inwards. The movements of the right eye were normal. In a few days he showed signs of aphasia which persisted for several weeks. When shown an object he was unable to name it, although he repeated the name when told. He also recognized a relative whom he had not seen for 4 or 5 weeks, but could not call her by name.

August 23.—Symptoms of imperfect drainage appearing, blunt scissors were inserted into the cavity of the abscess, and upon enlarging the opening there was a discharge of about 2 oz. of very foul pus. The cavity was irrigated and a rubber drainage tube was inserted in place of gauze. The aphasia continued the same.

Recovery was uninterrupted from this time, and the patient was discharged practically well, Sept. 12.

Remarks. Should the brain have been explored for the abscess at the time of operating upon the mastoid? Against such a step were absence of bulging of the dura or congestion and no visible erosion of the dura after careful inspection especially over the area

of the tegmen tympani. It is true that Wallace[6] reports a similar case in which an abscess involving the greater part of the tempero-sphenoidal lobe failed to produce bulging of dura into the opening made by operation. It is perhaps, therefore, unsafe to regard this failure as an absolute contra-indication.

Up to the time of the operation all of the symptoms could be accounted for by the condition found, and it did not seem advisable to injure brain tissue. The abscess, however, undoubtedly existed at that time and was the cause of the headache.

This question was discussed at a recent meeting of the Société Française d'Otologie de Rhinologie et de Laryngologie in 1897[7].

The prevailing opinion seemed in favor of delaying for a day or two after operating upon the extradural abscess. The suggestion was made, however, that the danger of infection through continuing the first operation into the brain might be obviated by applying the thermocautery to the spot through which the puncture was made.

The opinion of Macewen regarding the necessity of opening the squamous portion as well as opening through the tegmen tympani seems to be very generally shared. Review of available literature shows that the practice of trephining (or of opening by the chisel) over the ear is practically, perhaps quite, universal, and it would be presumptuous to assume from this one case that the prevailing opinion was erroneous. That such an opening is not invariably necessary is certainly demonstrated.

A certain advantage is gained by avoiding the external opening, in that the danger of hernia is reduced to the minimum, though this consideration should not deter the operator if any question exists as to the complete evacuation of the contents of the abscess.

The opening through the tegmen sufficed not only for the removal of a large amount of pus, but also of considerable sloughing brain tissue. That the evacuation and drainage were complete is shown by the perfect recovery.

The abscess caused by ear suppuration, as has been already said, is almost invariably situated in the temporo-sphenoidal lobe from one-fourth inch to an inch within the substance of the brain and directly over the roof of the middle ear, sometimes in the cerebellum from perisinusitis and rarely there is one in both regions.

The fatality is very great from failure in finding the abscess, from meningitis, secondary abscess, etc.

In the forty-three cases mentioned, a large percentage of the abscesses were situated in the temporo-sphenoidal lobe; the cerebellum

6 Translation Medical Chirurgical Society, Edinburgh, 1895, xv, 96.
7 *Ann. de mal. de l'oreille et du larynx*, Paris, 1897, p. 640.

was next in frequency and rarely there was one in the frontal lobe. Of the whole number all were operated upon and there were seven complete recoveries.

Imperfect drainage seems often the cause of a fatal result, and in my experience, gauze wicks are much less satisfactory than a rubber drainage tube. In the two cases of recovery mentioned the tube was used.

The loss of brain substance resulting from sloughing of hernia of the brain seems not necessarily to impair the mental condition of the patient recovering from a brain abscess. Epileptic seizures at variable times after recovery have been noticed and reported. These attacks are undoubtedly due to pressure from cicatrical tissue. In one case under my observation the attack appeared six months after the operation, gradually growing less in severity and frequency.

Lumbar puncture is of undoubted diagnostic value in many cases. In my cases at the Infirmary, puncture made at the time of operation, has shown an opaque, cloudy fluid and this not only in cases of meningitis but also in cases of sinus thrombosis. The same has been observed recently in cases of brain abscess; one reported by Grossman[8] of Berlin and another a recent one of my own, of recovery after operation.

This fact seems to indicate that finding of a cloudy fluid (per se) is not conclusive evidence of meningitis.

Micro-organism may be primary or secondary considered in their causative relation. The diplococcus intra-cellularis of cerebro-spinal meningitis may be considered as primary and is rarely seen by the otologist unless ear disease intervenes. The more common forms, streptococci or mixed infection are observed as secondary.

215 Beacon St.

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8 *Archiv f. Ohrenheilk.*, Dec. 29, 1904, p. 24.

SYMPTOMATOLOGY, DIAGNOSIS AND TREATMENT OF SIGMOID SINUS THROMBOSIS.*

BY JAMES F. MCKERNON, M.D., NEW YORK.

In speaking of the symptomatology of this disease, I shall do so under three heads: First, the symptomatology in the typical cases; second, in the atypical; and third, in those where the bulb and sinus are primarily involved without macroscopic disease of the mastoid process. As most of the cases coming under our observation are those secondary to a mastoid involvement, or developing after the mastoid operation has been done, there are certain definite symptoms present which are fairly constant, and without much delay enable us to recognize this condition.

Temperature. The symptom which I consider by far the most important is that of temperature. This depends upon the amount of septic material entering the general circulation, which, if it be large, is immediately followed by a rise from normal to 104°, 105°, 106° F., or even higher, and is quickly followed by a remission to normal or below. There may be only one rise during a period of twenty-four hours, or several may take place, depending upon the rapidity with which the poison is entering the general circulation. If the patient is kept under observation for several days, these exacerbations of temperature become more frequent, and the variations greater.

Chills. They are present in only a certain proportion of the cases seen. When present, they usually precede the rise in temperature, and are followed by profuse sweating. Many of the cases coming under our observation exhibit no definite chill. They merely complain of a slight chilly sensation, and oftentimes this is overlooked, unless the nurse in attendance is on her guard and watching for such a manifestation. In a post-operative mastoid case with numerous temperature variations, these chilly sensations are quite as important as though a decided chill were present.

Pulse. In cases of thrombosis, where there is a sudden and high elevation of temperature, there is a corresponding rapidity of the pulse rate, ranging from 120 to 170 per minute. In those of a lower temperature range, the pulse is often between 100 and 120, and when complicated (as oftentimes is the case) by a collection of pus in the brain, it is very much slower.

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* Read at the Meeting of the American Laryngological, Rhinological and Otological Society, held at Boston, June 5 to 8, 1905.

Respiration. During the earlier stages of thrombosis, the respirations are little affected, becoming only slightly increased during the high temperature ranges.

Pain. In most cases of thrombosis coming under our notice, the degree of pain is greater than that present when only an ordinary mastoiditis exists, or than that following the average post-operative case. The pain is usually referred to the side of the head, and to the occipital region, and is very frequently localized in the region of the torcular. When pain is present in the neck, I think it is usually due to the infected chain of lymphatic glands in this region, rather than to any obstruction in the vein.

Nausea and Vomiting. These symptoms are usually present at some stage of the disease, in a greater or less degree. The vomiting usually takes place at first, following the drinking of some fluid, but later on may occur at any time independent of the ingestion of solids or fluids.

Intra-ocular. In about one-third of the cases coming under our observation, the eye symptoms have been present; in the remaining two-thirds, the eyes are negative. When puffiness of the eyelid on the affected side, is present, it sometimes is caused by extension of the clot to the cavernous sinus, and also by an interference with the return ophthalmic circulation.

Vertigo. I have observed its presence only when the meninges are involved.

Cerebration. This has been normal except in advanced cases. We were formerly told to look for cerebral manifestations and believed they should exist in the majority of cases. This has not been my experience, for while the patients are drowsy and do not wish to be disturbed, yet they answer questions intelligently when aroused. This drowsiness increases, however, if the disease is allowed to go on unchecked, and later, there are distinct evidences of impaired cerebration.

Local Symptoms. We occasionally find the presence of œdema in the mastoid region, and œdema over and around the exit of the emissary and occipital veins. The symptom described by Gerhardt, and to which has been given his name, namely, that when pressure is exerted over both the external jugular veins, it will show a marked increase of blood passing through the vein of the unaffected side, I have never seen demonstrated. In a fair proportion of the adult cases, there is a marked stiffness of the muscles of the neck on the affected side, and in several instances aside from this stiffness, I have observed a marked rigidity present.

Constipation. In all the cases coming under my observation, this symptom was present, and while a very common one, it is one that

I believe, coincides with the earlier stages of the disease. In the later stages of the disease, or when there is an advanced general sepsis, diarrhœa is frequently present.

General Symptoms. Among some of the general symptoms at the outset of the disease may be mentioned malaise, loss of appetite, a dry and heavily furred tongue, and a foul breath. The face wears an anxious and pallid look, the skin is dry, and later presents a yellowish tinge indicative of sepsis.

Physical Signs. One of the physical signs which we have been told to watch for, has been a hard cord-like swelling in the neck, along the course of the internal jugular vein, and when such a sign was present it denoted a thrombus of the vein. While unquestionably such a physical sign does occur, in the experience of the writer, it is very infrequent, as I have never been able to demonstrate such a condition along the course of the vein, though I have tried to do so repeatedly prior to operation.

The Atypical Cases. These are cases invariably following a mastoid operation, and usually do well for a few days after the mastoid has been opened. Then the patient becomes restless, irritable, and disinclined to take food. The tongue, which before was clean and free from any coating, becomes dry around the edges, and presents a whitish, glazed appearance in the centre. The pulse increases from 100 to 130 per minute, and there is a slow, gradual rise of temperature to 103°, 104°, 105° F., or even higher, remaining so for several days. In some of the cases it will not vary a degree in twenty-four to forty-eight hours, while in others there is a little more variation in the temperature, but there are no sudden drops and no sudden rises. The patients complain of headache, and occasionally of nausea, but very few reach the vomiting stage. They are unable to sleep for any considerable period of time, and if surgical measures be not instituted, they later show all the signs of pyæmia. There is no chill or chilly sensation present. Cerebration is clear, the only evidence of any mental disturbance being an occasional irritability of temper.

In the third class of cases, there is an acute purulent otitis present, with the usual symptoms found accompanying this condition, and the subsequent symptoms detailed are the result of a direct infection from the tympanic cavity to the blood current closely adjacent, namely, through the floor of the tympanum to the jugular bulb. The explanation of the possibility of this is quite clear if we bear in mind the fact that in a certain percentage of the skulls examined, we find an unusually high dome, encroaching upon the middle ear cavity, or a dehiscence may exist in this region. Under such conditions as

these, it can readily be seen how an active purulent infection of the middle ear cavity can primarily affect the blood current, without first having to travel its usual course through the venous structure of the mastoid bone, the course of infection being through the small communicating veins and lymphatics, or by a process of absorption directly through the thin wall of bone in this region. The symptom of greatest importance is an unusually rapid rise in temperature, from 99°, or 100° to 104°, 105°, or even 106° F., and quite as sudden as the rise a fall to 97°, 98°, 99°, or possibly 100° F. The temperature may remain low for several hours, and then quickly rise again to the points first mentioned, to be followed by a rapid remission, and this may go on indefinitely until the end. During the exacerbations of temperature, the pulse rate is rapid, ranging from 120 to 170 per minute. There is no chill present. The only evidence of chill found in these patients is, that if seen when the temperature begins to rise, they will be found to have cold hands and feet. They are exceedingly fretful and irritable, and later become drowsy. The eye signs are negative. If the temperature range is allowed to repeat itself for several days, the tongue becomes white and dry. During the temperature remissions these patients, (and they are usually young children) feel remarkably well, will ask for food, and wish to sit up and play with their toys. This is one of the phases of the disease which the parents and uninitiated find hard to comprehend. They see such an apparent improvement in the little ones that they are misled as to the dangers existing, and often believe they are well on the road to recovery until the next temperature was occurs. The respirations are only slightly increased.

Diagnosis. The first class of cases is easily recognized, our diagnosis being based upon the temperature changes, and the presence of the chill or chilly sensation preceding the rise in temperature, and following an operation upon the mastoid. If most of the symptoms given in this class be present it is, of course, a comparatively easy matter to make a diagnosis, but if several are absent, the diagnosis can be made from those given above. In the cases where the sinus is operated upon at the same time that the mastoid operation is done, and we have no previous symptoms to guide us, we determine whether or not it is necessary to operate on the sinus at this time by the physical signs which are found present when the mastoid is opened. They are briefly, the presence of a necrotic area of bone over and around the sinus, with usually an epidural collection of pus. The dura covering the sinus wall is either markedly thickened, and darker in color, or it may present a lusterless appearance, darker at one point than another, and usually the lower end toward the bulb

is white or grayish in color. The sinus in some cases is easily compressible, and does not fill readily when the pressure is removed.

Bacteriological examination of the discharge is of value only in that it gives us knowledge of the characteristic infection. Another valuable aid in diagnosis is the blood count, not so much for determining whether a leucocytosis is present, but to determine the polynuclear percentage, as for example, if we find a polynuclear count showing a percentage of over 80, no matter what the leucocyte count be, whether great or small, we are almost certain to find an infective process disturbing the patient's economy.

The diagnosis in the second class, after eliminating all other diseases, is made from the continuous high temperature and the fact that the patient is not progressing as favorably as he should after an ordinary mastoid operation. A physical sign which I consider of the utmost importance in this class of cases is that, when we inspect the wound, we find every portion of it apparently doing well, and covered with granulations, except one point, and that point is the bone forming the sigmoid groove. We will find the bone in this region darker in color than when it was first exposed at the time of operation, and there will be no granulations found upon any part of it. In other words we have a mastoid cavity showing every evidence of healing except the bone over the sigmoid groove. I have seen this condition persist following a simple mastoid operation for between two and three weeks, where the sinus was involved, or had become involved subsequent to operation. The polynuclear count is of the same value here as in cases of the first class, and should always be made, as a high polynuclear percentage is of the greatest help in determining whether an infective process exists.

In the third class the diagnosis is made almost entirely from the wide temperature range, closely following, as it does, an acute purulent otitis. Bacteriological examination of the discharge is of value only as above stated. The same is true of the blood count, but the utmost importance should be attached to the polynuclear percentage, for if we find it between 80 and 90 it is, I believe, a distinct evidence that our patient is suffering from a septic process. All other diseases being eliminated, the cause of our patient's condition must be referred primarily to the ear.

Treatment. The treatment in the first and second class of cases does not materially differ. Where a diagnosis of sigmoid sinus thrombosis has been made, I believe it is wiser, provided the patient's general condition will admit of its being done, to primarily expose, ligate, and resect the internal jugular vein from a point below at the clavicle, to its exit from the skull. Should any of its tributaries be

found involved, they should also be ligated and resected well beyond any point of macroscopic involvement. All diseased glands encountered during the resection of the vein, should be removed. After this has been done, the sinus should be exposed from above the bend down to the region of the bulb, the dura should be opened freely with a scalpel, and the contents of the sinus evacuated. Should we be unable to obtain a flow of blood from the distal end of the sinus, then there should be a still further exposure in this region, and we should proceed backward toward the torcular, or even as far as this channel, until we secure a free return flow of blood; for, if we do not obtain a blood current in this region sufficiently free to show that all obstruction has been removed, our patients subsequently do badly, either from an extension of the infective process to other blood channels, or an encephalitis develops one or two weeks later, caused by an extension from the infective process that we have left in this region. When we remove the clot in the region of the bulb, we will find that in almost every case where the vein has been removed as the first step in the operation, that the so-called return flow is quite as free here as we would expect to find it if we had the internal jugular vein carrying on its usual function, the blood coming no doubt, from the inferior petrosal sinus. If, as occasionally occurs in this region, we are unable to obtain a return flow of blood, it means that the inferior petrosal sinus is thrombosed, and when such a condition confronts us, we should, provided the patient's general condition will allow it, expose the sinus and remove the obstruction, as otherwise we are courting danger by allowing an infective process to remain here which may at any time cause further trouble for our patient.

The wound in the neck should be flushed with a warm saline solution, a large cigarette drain inserted its entire length, and the soft parts closed by a continuous suture, to within a very short distance of its upper end, and either a wet saline or bichloride dressing applied. This dressing should be renewed at the end of forty-eight hours. At the first dressing, the cigarette drain should be drawn out for about an inch, and cut off. Subsequently the neck should be dressed once every twenty-four hours in this manner, and at each dressing, the drain should be drawn out about the same distance, and the end cut off as before, so that at the end of four or five days, the entire drain has been removed and primary union is accomplished.

In the third class of cases, the patients being nearly all very young children, the ideal treatment of course would be the same as in our other cases, but here we must remember that these cases are caused by a primary infection of the blood current and when operated upon early, the percentage of recoveries is in favor of removing the clot

without ligating the vein. For these little patients do not bear prolonged operations well, and it is a matter of much more difficulty to ligate and resect an internal jugular vein in a very young child, than it is in an adult, for we have a neck to deal with that is short and chubby, and usually a number of enlarged glands to encounter, and up to the present time my experience has been not to ligate in these cases, or if ligation becomes necessary, to do it at a subsequent operation, where the work can be done rapidly, and not subject these little patients to the added risk of a prolonged operation. It must be said, however, that in this class of cases, where a so-called free hemorrhage is obtained from below, we can never be sure that all infective material has been removed, for, so far, it has been an absolute impossibility to pass a curette from above into the jugular bulb, and in all probability a large number of our cases operated upon without ligation of the vein, have some infective material left in this region, not, however, in such quantity that the system can not care for it, for were this so, these cases would all be fatal. I believe that in the average case of sinus and bulb involvement, it is wiser to ligate and resect the vein, if the patient's condition will admit of it. Certainly in the cases of infected sinus or bulb thrombosis I feel easier as far as the patient's safety is concerned, if this port of entry is obliterated.

In the cases operated upon without ligation of the vein, where they show a varying post-operative temperature curve, it means that there is still some infective material being displaced from time to time. The patients improve notwithstanding, because the major portion of the infective material has been removed, and the system thus strengthened, is enabled successfully to care for that remaining.

In young children the time element is one that enters largely into a favorable prognosis, for the shorter the time that we keep our patients on the operating table, the quicker will be their convalescence. I am convinced that our results would be better did we operate during the temperature remissions, rather than when the temperature is at its height; for, if operation takes place while the temperature is low, certainly the system has more reactive power, there is less depression, and a more rapid convalescence will surely follow.

A word about delaying operation in these cases. Eliminate, if possible, all other diseases, and if this is done, then we must return to the original focus of infection, and follow this up in order to determine the cause of our patient's condition.

62 West 52d Street.

PATHOLOGIC FINDINGS OF THE INTRA-CRANIAL COMPLICATIONS OF MIDDLE EAR DISEASE.*

BY THOMAS J. HARRIS, M.D., NEW YORK.

When our Secretary honored me with an invitation to present a paper on "Pathologic Findings" in connection with this symposium on the intra-cranial complications of ear affections, I was somewhat at a loss how best to proceed in order to avoid a more or less text book presentation of the subject. After some reflection, it occurred to me that an analysis of a considerable number of such cases in the hands of our most experienced American operators might offer food for study and discussion. We do not fail to remember the many valuable contributions along the same line from our European confreres and especially Kœrner's and Macewen's classical works; and yet it seems to us that an independent consideration of the subject might not be without value. To this end, we addressed a letter of inquiry to a number of men connected with our largest special hospitals asking for the following data:

1. Total number of cases of intra-cranial diseases treated, divided as follows:
   - *a.* Sinus thrombosis
   - *b.* Meningitis
   - *c.* Encephalitis and brain abscess.
2. Number of deaths and recoveries, including number of cases operated upon.
3. In how many cases was the pus from the ear examined bacteriologically, with the results obtained.
4. Was lumbar puncture made, and if so, with what results.
5. Situation and character of the lesion, as determined operatively or by post mortem examination, (meningitis, serous or purulent; thrombosis, what sinus involved; abscess, single or multiple, where situated, character of pus, when examined.)
6. A brief abstract of each autopsy protocol.
7. Antecedent condition of the ear—whether otitis was acute or chronic; whether intra-cranial involvement followed a middle ear or mastoid operation.
8. Result of blood examination when made.
9. Mode of infection, where determined.

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* Read at the Meeting of the American Laryngological, Rhinological and Otological Society, held at Boston, June 5 to 8, 1905.

In most instances the lateness of the hour at which the letter was sent and the amount of work involved prevented compliance with our request. We desire, however, to publically express our thanks to Dr. James F. McKernon for his prompt response and for the statistics furnished by him from the records of the New York Eye and Ear Infirmary, representing without doubt the largest number of such cases treated by any one institution in this country. This report must be then of necessity incomplete and is to be viewed rather in the nature of a preliminary one only. It has to do chiefly with the records from the Ear Department of the Manhattan Eye, Ear & Throat Hospital and some of the various points considered can be included under "Pathologic Findings" possibly only by the broadest construction of the term.

During the past ten years, 1895-1905, there have been treated in that institution 41799 cases of ear disease. Of these 32486 suffered with disease of the middle ear and 12744 cases were of a suppurative nature, acute or chronic. Of these 32000 odd cases of middle ear disease, there are records more or less complete of 60 cases of intracranial disease divided as follows:

I. Sinus thrombosis	23
II. Brain abscess	7
III. Meningitis	30

I. SINUS THROMBOSIS.

A. Of the 23 cases 14 died, 9 recovered. The jugular vein was ligated in 15 cases, not ligated in 8. Of the 15 cases where the vein was ligated, 6 recovered, 9 died, all but two from one to twelve hours subsequent to the sinus operation. Of those not ligated, 3 recovered and 6 died. It will be seen that in this small series of cases there was no great difference as far as recoveries are concerned between those cases where ligation was practiced and those where it was not practiced.

B. In this connection it will be interesting to recall the statistics of Kœrner. He has collected 308 cases with 180 recoveries or 58-4/10%. The vein was not ligated in 132 cases of which 77 recovered or 58-3/10%. In 94 cases the vein was tied before the sinus was opened, with 56 recoveries or 56%. In 68 cases the vein was tied after the opening of the sinus with 38 recoveries or 55%.

While it is true that statistics may be very misleading and the particular conditions under which ligation or non-ligation were practiced in these cases are not stated, it is not without significance that in these cases collected from all sources there is virtually no difference in the results by the different methods of treatment.

	Age	Sex	Condition of Ear	Duration.	Pus Findings.	Sinus Operation.	Result.
1					Diploc Extra-cell.	Yes.	Recovery.
2	17	m	O. M. S. C.	3 Years.		Yes.	Death.
3	12	m				Yes. After ligation of vein.	Death.
4	17		O. M. S. C.	2 Years.		1st. Radical Berens flap. 2d Sinus and jugular ligation.	Recovery.
5	54	m	O. M. S. C.	3 Months.		Yes, Clot turned out.	Death.
6	21	m	O. M. S. C.	8 Weeks.		Yes, Clot turned out.	Recovery.
7	12	m	O. M. S. A.	3 Days.		Yes, Clot turned out.	Death.
8	12	m	O. M. S. C.			Clot turned out of Sinus.	Recovery.
9			O. M. S. A.	2 Weeks.		Clot turned out of Sinus.	Death.
10	17	m	O. M. S. C. O. M. S. A.	1 Week.	Pneumococci and Staphylococci.	Clot turned out of Sinus.	Recovery.
11	22	f	O. M. S. A.	3 Weeks.	Streptococci and Diplococci.	1st operation did not show clot. 4 days later clot discovered.	Death on day of 2nd oper.
12	19	m				Clot turned out.	Recovery.
13	child		O. M. S. C.			Pus found in Sinus and Cerebellum.	Death on table.
14	10		O. M. S. C.		Diplococci, Extra and Intra-cell.	Pus in mastoid and Sinus.	Death.
15	7		O. M. S. C. O. M. S. A.	1 Week.		1st Schwartze, pus. 2nd op. on following day. Sinus found collapsed.	Death.
16	22	f	O. M. S. C. O. M. S. A.	1 Week.		Clot turned out of Sinus.	Death 21 days after operation.
17	21		O. M. C. A.			Mastoid found healthy. Clot turned out of Sinus.	Recovery.
18	3		O. M. S. A.			Septic clot in sinus. Curette entered cerebellum thro' sinus wall.	Death.
19	9		O. M. S. C.		Mixed.	1st op. clot turned out. 2nd brain abscess drained. 3rd op. jug. vein excised.	Death Haem. fr. brain.
20	21		O. M. S. A.	3 Weeks.		Pus in sinus. Mastoid abscess.	Recovery.
21	19		O. M. S. A.			Pus in Sinus. Sinus opened.	Recovery.
22	29		O. M. S. C.			1st oper. Schwartze. 2d op. 3 days later sinus ligated, clot removed.	Died on table.
23			O. M. S. A.		Pneumococci.	1st. oper. Schwartze. 2d sinus exposed, neg. 3d jug. vein ligated. 4th bulb exposed.	Death.

SINUS THROMBOSIS.

	Result.	Was Vein Tied?	Condition of Mastoid.	Was Neck Closed?	Character of Cl
	Recovery.	No.	Diseased.		Parietal.
	Death.	Yes.	Diseased.	Yes, gauze drain.	
	Death.	Yes.	Previous operation.	Yes.	
	Recovery.	Yes.	Radical operation.	Yes, gauze drain.	
	Death.	No.	Opened. Found Healthy.		
	Recovery.	No.	Healthy.		
	Death.	Yes but not resected.			Septic.
	Recovery.	Yes, before sinus.	Diseased.		
	Death.	No.	Diseased.		Septic.
	Recovery.	Yes.	Diseased.		
	Death on day of 2nd oper.	Yes, at 2d op.			
	Recovery.	No.	Schwartze, 2 mos. before.		
	Death on table.	Yes.	Diseased.		
	Death.	Yes, on day after 1st operation.	Diseased		
	Death.	No.	Diseased		
	Death 21 days after operation.	No.			
	Recovery.	12 days later.		Partially.	
	Death.	No.		No.	
	Death Haem. fr. brain.	Yes.			
	Recovery.	Yes.			
	Recovery.	Yes.			
	Died on table.	Yes, at 2d op.			
	Death.	3 Weeks after readm.			

Character of the disease in the middle ear. Acute suppuration existed in 7 cases. Chronic suppuration in 12 cases. In one case, an acute non-suppurative process alone existed. In 3 cases, the condition of the ear is not stated. In other words, chronic disease was found present in almost twice as many cases as acute disease. This is in line with Hessler's statistics, who found that in 130 cases 99 had chronic middle ear suppuration and 31 acute. Kœrner states that his experience is just the reverse. As regards the age, it is noticeable that in only one case was the patient more than 29 years.

Optic Neuritis. Optic neuritis existed in three cases. This is quite at variance with Kœrner's experience, who states that he has never met with a case of optic neuritis in an uncomplicated sinus thrombosis.

In the first of the three cases (case 21), an acute suppuration process had existed for three weeks. Six days after admission to the hospital, the patient became stupid and the optic neuritis developed.

In the second case (case 3), the neuritis appeared on the day after admission to the hospital and was followed by the operation on the next day.

In the third case (case 4), it appeared twelve days after the operation. This was a case of Dr. T. P. Berens and was regarded by him as a manifestation of hysteria. The group of symptoms, unconsciousness, optic neuritis, vomiting, dilation of the pupil of the side affected and twitching of the left arm and leg would point strongly, however, to a meningial irritation. The case recovered.

Temperature. There was nothing particularly significant in the temperature curves in the different cases. Usually the temperature was high. This, according to Kœrner, would be indicative of the septic state and is borne out by the fact that in ten cases the disease was of such an advanced type that upon admission into the hospital they were in more or less an unconscious state. This would clearly point to the fact that the significance of the symptoms of this dread complication of middle ear disease is not yet sufficiently known to the profession at large.

Chills. Chills were noted in only 8 cases. Doubtless careful inquiry would have brought out the fact that the chilly sensations to which McKernon has called attention was present at some stage of the disease in all.

Dysphagia. In two cases, difficulty in swallowing was a prominent symptom. A case of Beck's is quoted by Kœrner where there was paralysis in swallowing due to pressure on the glosso-pharyngeal nerve. This, however, must be a rare symptom.

Complications. Three cases were complicated by cerebellal abscess. Metastasis in the arm was noted in one case. On one a cyst

of the liver, not regarded as septic, was found and in one case an abscess in the plural cavity. One case (case 4), that of Berens just referred to, had a paralysis of the trochlea. This as far as I can find has never been encountered save in thrombus of the cavernous sinus which was clearly not present here. It is difficult to account for it. As was stated, the case recovered. Finally, death occurred twice upon the table. These fatalities ought to emphasize the importance of early operation as advanced by Von Bergman many years ago. In scarcely one case can it be stated that the operation was performed at an early stage of the disease.

II. BRAIN ABSCESS.

Seven cases. Seven deaths.

Situation. In tempero-sphenoidal lobe six times. In Cerebellum once.

Character of the disease in the middle ear. In three cases there was an antecedent acute suppuration of the middle ear; in the remaining four the process was a chronic one. This is at variance with Grunert's statistics where in 91% of the cases the abscess followed a chronic otorrhœa.

Jansen found, in 2650 cases of acute middle ear suppuration, brain abscess once; in 2500 cases of chronic suppuration, six times. The increased proportion of acute cases in the Manhattan records is to be noted. In 3078 O.M.S.A. three cases. In 8722 O.M.S.C. four cases. Or one in every 1000 acute suppuration as compared with one in 2200 chronic.

The classical mastoid operation was primarily performed in six of the cases to be followed later by an exploration of the brain on account of the symptoms which developed.

Symptoms. Of the symptoms which were chiefly complained of, pain in the head was a prominent one and is mentioned in five of the seven cases. In two of these, the pain was on the side of the head corresponding to the abscess. In one, it was referred directly to the ear.

Vomiting. Vomiting was a prominent symptom in only three, according to the notes of the cases. Whether present in the others, we can not say.

Epileptiform Convulsions. One case had a striking symptom which for a time baffled diagnosis. The history of this case is briefly as follows: Case 3, H. A., adult, service of Dr. Clemans, admitted April 2, 1902, for pain in her ear of nine days' duration. A simple mastoid operation had been performed two years before on that side. At the operation, which was performed at once, some rough bone was discovered in the antrum but nothing else and the wound was

closed by silk sutures. Upon the first dressing three days after the operation, the wound was found clean. Three days later, the patient became restless, complained of pain in the head, and, ten minutes after the dressing, had an epileptiform fit. These fits occurred daily. On the ninth day after admission, she had nine attacks. The fifteenth day she became stupid and died on the sixteenth day after admission. The autopsy revealed an abscess in the tempero-sphenoidal lobe, containing 2½ oz. of pus. This was located but ½ inch from the surface and communicated by a sinus externally with an erosion discovered on the left temperal lobe near the base. Here an oval spot 1x½ inch was found showing cerebral softening. The abscess was lined with a pyogenic membrane which showed numerous fresh hemorrhages. From this cavity, another sinus extended to another large abscess just above the fissure of Silvius. A small perforation, 4 mm. in diameter, was found in the tegmen tympani. It is to be added that the temperature was normal upon admission and until five days after the operation and then rose to 101° F. The pulse ranged between 80 and 100 and from 66 to 90 at the time of death.

Kœrner regards convulsions as in no way characteristic of brain abscess. They are usually present in abscesses of the cerebrum and are limited to the extremities and the face of the opposite side. Such marked seizures as occurred in the case just stated, we believe however, are exceptional.

Temperature. Temperature in two cases was normal on admission. According to Kœrner, again, it can remain so through the entire disease and this condition is especially wont to be met in the latent period. The pulse in every case was slow, below 100 even when high fever was present, and below 70 in four of the cases. Kœrner regards this symptom as a valuable but unreliable one. This agrees with Schmiegelow who in a recent contribution on this subject to the Archives Internationales de Laryngologie, for April, 1905, in which he reports 19 cases of brain abscess of his own, does not find hyperpyrexia a characteristic sign of disease. It may be added that even pain, which he regards as the most usual symptom to be met, was absent in two cases.

Cessation of Respiration. In two cases the interesting phenomenon occurred of cessation of the respiration during operation at the time the brain was punctured. In one of the cases, the abscess was located in the cerebellum and in the other in the tempero-sphenoidal lobe. In the first case, respiration was maintained artificially for some time and the heart continued to beat for five minutes. In the second case, one of Dr. Berens, a tracheotomy was performed and the breathing maintained for three hours. Schmeigelow, in the arti-

cle just quoted, refers to a case of his own where a similar accident occurred. Macewen, in his well known work upon "Pyogenic Disease of the Brain and Spinal Cord," reports two cases of cerebellar abscess where this occurred. Besides these, Schmiegelow refers to one case reported by Barker, three by Sir Dyce Duckeworth, one by Hoffer and one by Fleece, making in all, including the two cases reported by ourselves, eleven cases where this phenomenon occurred, with only two exceptions the abscess being located in the cerebellum. The cause of this would seem, in all probability, to be due to a great increase of intra-cranial pressure paralysizing the respiratory center.

Finally, one other case is of such unusual interest that we desire to refer to it somewhat at length. Case 4, G.M. age 14, a case of Dr. Kenyon, admitted March 29th, 1900, to the hospital with the history of pain and discharge from the ear for three weeks. The following day, a mastoid operation was performed. Pus was encountered and a free opening was made into the middle ear through the antrum. In the course of the operation, the dura was exposed. The wound was closed by sutures to heal by the contained blood clot. Upon June 2d, there was some suggestion of pus in dressing. The wound was not uniting properly. June 4th, the stitches were removed under ether, the wound cleansed of the granulations which had formed and packed with sterile gauze. Upon June 10th, severe pain was complained of in the forehead and in the side of the head. Ether was again administered, and the dura was found bulging at the spot previously exposed at the first operation, and was opened. A free discharge of foul pus was obtained. A counter opening was made through the temporal bone and the brain packed. Previous to the operation, the right pupil was found dilated to twice its natural size. This disappeared after the operation. The wound was dressed by means of gauze drainage and the boy discharged from the hospital July 30th, two months after admission about well. The bacteriological examination of the smear from the ear showed a few streptococci. Temperature before abscess was opened was 101° F. and so continued for one week afterward. The pulse, before the operation, ranged from 96 to 92 gradually falling from 80 to 76 and at one time to 66 after the operation. On Oct. 2d of the same year, two months after his discharge from the hospital, he was readmitted because of a return some weeks before of ear symptoms; and a second operation upon the brain was performed the following day, and pus was found beneath the dura extending forward to the frontal lobe; 2 oz. were evacuated. The wound was packed with plain gauze. The following day the patient was restless and noisy. Three days after the operation, he was delirious. On the eighth day,

	Age.	Condition of Ear.	Situation of Abscess.	Exam'n of Ear Pus	Operation.	Result.	Symptoms.
1	43	O. M. S. A. 1 Month.	Tempero-sphenoidal lobe.	Dip. Ext. Cell. Streptococci.	1st, Schwartze Dura exposed and found covered with granulation. 2nd, Brain opened.	Death.	Vertigo, vomiting. H crania. Eye sympto lacking.
2	9	O. M. S. C.	Cerebellum			Death.	Hemicrania, vomiting lirium, twitching.
3	30	Schwartze 2 yrs. ago O. M. C. A. 1 Week.	Tempero-sphenoidal lobe.			Death.	Pain in ear 8 days operation, restless. in head for 5 day epileptic fits in one
4		O. M. S. A. 3 Weeks.	Tempero-sphenoidal lobe.	Streptococci.		Death.	
5	46	O. M. S. C. 7 Years.	Tempero-sphenoidal lobe.			Death.	Pain in ear on admis
6	31	O. M. S. C.	Tempero-sphenoidal lobe.			Death.	Two days before adm discharge from ear ped, vomiting, optic ritis.
7	7	O. M. S. A. following fall.	Tempero-sphenoidal lobe.			Death.	Drowsy. Pain in head odor to dressings. in neck. Delirium.

SCESS.

Symptoms.	Temperature.	Pulse.	Remarks.
Vertigo, vomiting. Hemicrania. Eye symptoms lacking.		48-56.	One ounce of pus found in abscess at 2nd operation.
Hemicrania, vomiting, delirium, twitching.	100	52-88.	Respiration ceased on puncturing cerebellum. Heart continued to beat for 5 minutes.
Pain in ear 8 days after operation, restless. Pain in head for 5 days. 9 epileptic fits in one day.		80-90. 66-90 at death.	Abscesses, two in number, lined with pyogenic memb. Perforation in tegmen-tympani. Sinus from abscess to ear. 11 days after 1st operation, pain. At 2d operation pus found in cerebrum. Packed counter opening.
Pain in ear on admission.	102	96-100.	
Two days before admission discharge from ear stopped, vomiting, optic neuritis.	98-99.	60 before 2nd op.	Breathing stopped during operation. Tracheotomy. Respiration artificially produced 3 hours.
Drowsy. Pain in head. Bad odor to dressings. Pain in neck. Delirium.	98 on readmission. 101 and 102 on 3d day following.	92-118. 30-90.	Patient discharged from hospital 3 months after Schwartze operation. Readmitted 6 weeks later.

headache was complained of. At the time of dressing, the wound was found clean. For the next two weeks, constant pain in the head was complained of, requiring the use of morphine. Chills now developed on about the 31st of October. One month after admission he died. Temperature was high and of a septic character throughout the disease. Pulse ranged from 30 to 140. No autopsy.

Remarks. Here without much question was a case of infection due to imperfect drainage at the time of the original mastoid operation. Reference will be made later to immunity to danger in most cases where the brain is exposed. This must be regarded as an exception. The second point is the character of the dression, namely, packing with gauze. Most of our successful operators condemn this as a dangerous procedure. Finally the remarkable slowness of the development of the symptoms must be noted. Such improvement as to warrant discharge from the hospital and the remaining away for two months is certainly a surprising phenomenon.

III. MENINGITIS.

Of the 30 cases of which records are given, 29 died, 1 recovered. Of these, six were those of children two years or under. One was in a child of six and one in a child of eight. The rest were adults. In fifteen cases there was a chronic suppuration of the middle ear, in 10 an acute suppuration, in 4 the condition was not given and in 1 ear was apparently healthy.

The bacteriological findings can be regarded as in no way conclusive. In three cases, the steptococcus was found; in six, the diplococcus; and in six, there was a mixed infection. It would only be suggested from this small number of 15 cases, where the results are stated, that the mixed infection is of as common occurrence as the diplococcus and twice as common as the steptococcus.

The lumbar puncture was not practiced long enough to permit of any report.

Symptoms. In fourteen cases the *temperature* upon admission is stated. In nine of these it was normal.

Vomiting was a characteristic symptom in four cases.

Headache was present in nine cases.

Vomiting according to Barber can be regarded only as a symptom of intra-cranial disease and is never solely characteristic of brain abscess nor yet of meningitis. Among the numerous symptoms, a *sudden blindness* developed in one case the day before admission. At the autopsy miliary tubercles were discovered lining the pia. The blood vessels of the brain were generally congested.

In one case the symptoms followed after a furunculosis of the auditory canal. The channel of infection is not definitely stated ex-

cept in two cases where it occurred through the tegmen typani. In one case, the symptoms followed an acute abscess of the middle ear, the result of infection through the nose following the use of a Birmingham nasal douche.

Optic Neuritis. Optic neuritis was met in one case. The single case of not fatal result is of sufficient interest to be briefly referred to.

(Case 29). It concerns a child of two, a patient of Dr. Haskins, who was admitted to the hospital July 7th, 1902, for a secondary mastoid operation. A discharging sinus was found over the right mastoid near the tip. At the time of operation, granulations were found in the attic and antrums. The sinus was exposed and found healthy. The case eventually recovered and was discharged from the hospital three weeks after operation. Two weeks later he was readmitted with a temperature of 104° F., very restless, with twitching of the muscles of the right arm. The right pupil was dilated and there was slight facial paralysis. The following day, the 15th, he vomited and there was a paralysis of the right side. On the 17th, he was apathetic but on the 19th appeared brighter. Mastoid wound looked better. Upon the 23d day, the paralysis had about disappeared. Upon the 20th of Sept. he was discharged. Later he was readmitted for skin grafting. In personal conversation with Dr. Haskins, this case which he has previously reported, he regards as of a tubercular nature. The child is still under observation. This case suggests the possibility of recovery after the serous form of meningitis. Until recently such an outcome was not entertained; but in the last few years several authorities, Kœrner among others, have called attention to this, and a number of cases are on record where such a result apparently has taken place.

Meningitis following the Radical Operation. Of great interest is the number of cases following the radical operation, ten in all. In these the temperature was normal at admission in all but two. It is a striking fact in how large a number of cases of simple mastoid operation as well as of the so called radical operation, the dura is exposed with no unpleasant sequellæ. Rarely is another thought given to it. Indeed, it is the practice of some surgeons to go so far as to apply skin grafts upon the dura at the time of the primary operation. That this may be followed by disastrous results is witnessed by these ten cases. This is still more clearly evidenced by the fact that in cases 4 and 19 the post auricular wound was not closed at the primary operation and no symptoms of meningitis developed until two days after the second operation when skin grafting had been practiced and the wound closed. In the second of these two

cases, rubber tissue was used for packing the wound at the first operation. Both the sinus and dura were exposed at that time.

That this experience is not limited to the institution in question is shown by the statistics from the New York Eye & Ear Infirmary, where out of 22 cases of meningitis, 7 followed the radical operation. The writer in a paper read before the Eastern Section of this Society here in Boston, two years ago, took occasion to state that this operation must "not be regarded as free from risk to life." This warning note seems amply justified in the light of these 19 deaths in two institutions following the operation. In the ten years, from 1895 to 1905, mastoid operations were done at the Manhattan Eye, Ear & Throat Hospital of which some 83 were of a radical nature.

These startling figures, viz., out of 83 radical operations, 10 cases of fatal meningitis (or 1 in 8) developed is enough to give us cause for thought and bids us exercise the greatest care, in the selection of our cases, in technique and in most perfect asepsis. At the same time, it is only fair to add that meningitis also followed the simple mastoid operation in 20 cases (or 1 in 36). This shows that the simple Schwartze operation can be followed by fatal consequence; but in the case of the radical operation the proportion is vastly greater. The grave question is also raised of the wisdom, where the dura is exposed, of closing the wound at the first operation and especially of skin grafting at those points.

Conclusion. In conclusion the writer desires to emphasize the importance of greater attention on the part of the surgeon in charge to the taking and preservation of the histories of the mastoid cases. Too often this is left to the junior house officer who has had little or no experience and who is apt to make records of observations which are of little or no value. The only one competent to make the records is the surgeon himself, and this he can easily do by dictation to the house officer at the time of his daily visit.

Three recommendations in this direction suggest themselves.

First, every special or general hospital with an ear service should have an ear registrar with whom the responsibility for the compilation and preservation of all records should rest.

Second, a card catalogue index should be provided with a cross index according to disease. The following letter will illustrate the difficulty of following out an investigation like this, without some such letter index.

"I have delayed answering your letter of March 30th because I wished to see whether it would be possible for me to comply with your request. I am sorry to say that, after looking into the matter, I find that the data I could give you would be so incomplete and

really valueless, that it would not be worth the labor necessary. In both the Pennsylvania and Polyclinic Hospital there is no record of cases kept in such a manner as to permit looking up under the nature of the disease; they are all indexed by the names of the patients. One of the assistants in my clinic started to look up the matter; but he found that it would involve going over all the different cases admitted to the hospitals in recent years in order to find records of those cases presenting intra-cranial complications. We have no special hospital in this city devoted to ear, nose and throat work, and in the general hospitals the records of the ear cases are mingled with those of the others."

Third, Greater zeal and earnestness should be exercised on the part of the surgeon in charge toward securing autopsies. In this way and in this way only can the valuable material of the various institutions where otology is practiced be brought together for study and investigation.

117 East 4th St.

	Age.	Conditon of Ear.	Nature of Pus.	Operations.	Result.	Mode of Infection.
1		Old Mastoid. O. M. S. C.	Dip. Ext. Strept.	Radical Wound Closed.	Death.	From M. E.
2		O. M. S. C.	Mixed.	Radical Wound Closed.	Death.	From M. E.
3	34			Radical.	Death. 2nd Day.	From M. E.
4	1	O. M. S. C. Mastoid Sympt.	Strept.	Radical 2nd op. to Close Wound.	Death.	
5	36	O. M. S. A. 3 Weeks.	Dip. Ext. Ma. Cell.	Mastoid Opened.	Death.	Tegmen Tympani Fistula into Anterior part of Temp. Sphe. lobe.
6		O. M. S. A. 1 Week.		Mastoid Gran.	Death.	M. E.
7	40	O. M. S. A.		Pus in Mastoid Tegmen Soft.	Death.	
8		O. M. S. A. 3 Weeks.	Strept.	Pus in Mastoid 2nd op. Sinus Exposed.	Death.	
9	20	O. M. S. C. 7 Years.	Strept.	Schwartze Gran. in Cells.	Death.	M. E.
10		O. M. S. C. 5½ Years. 1 Week Ill.		Schwartze Pus in Cells.		
11	8	O. M. S. C. 4 Days before adm. ear stopped discharge.		Yes. No Disease of Sinus.	Died Same Day.	
12	15	O. M. S. C.	Smegma bacillus.	Radical for O. N. S. C.	Died.	M. E.
13	50	O. M. S. C. 6 Months.	Unknown.	Schwartze gr.	Died.	
14	36	O. M. S. A.		Schwartze gran. in cells. Drainage.	Death.	
15	16	O. M. S. A.	Dip. Intra-cell.	Radical.	Death.	M. E.
16	Adult	O. M. S. A.		Schwartze 12 days after beginning of att. pus.	Death.	Mastoid.
17	8	O. M. S. A.	Mixed.	Schwartze cholesteatoma perisinous abscess.	Death.	
18.		O. M. S. C.	Dip. Ext.	Radical. Schwartze 4 weeks previous.	Death.	M. E.
19	22	O. M. S. C.	Dip. Intra.	Radical Sinus and Dura Exposed.	Death.	M. E.
20	2			2nd. Schwartze Necrosis in M. E.	Death.	
21	26	O. M. S. A. 6 Days.	Dip. Ext.	Radical grans. in cells.	Death.	M. E.
22	50	Neg.	Dip.	Schwartze grans. in cells.	Death.	
23	Baby	O. M. S. A.		Schwartze. Secondary.	Death.	M. E.
24	1	O. M. S. C.	Tb. not found.	Schwartze.	Death.	M. E.
25	2	O. M. S. A.		Schwartze. Pus in Cells.	Death.	
26	6	O. M. S. C.	Dept. Ext. Strept. in Excess.	Schwartze.	Death.	Per Tegmen.
27	56	O. M.	Dip. and Strept.	Schwartze Acute Extensive Necrosis.	Death.	Per Tegmen.
*28	2	O. M. S. C.		Schwartze 1 chronic M. before.	Recovery.	
†29	25	O. M. S. C.		Schwartze extensive exploration of brain. neg.	D ath.	
30	21	O. M. S. C.	Mixed.	Radical acute.		M. E.

* Tubercular conditions suspected.

† Discharged. Re-admitted three weeks later. Stupid.

ode of Infection.	Autopsy.	General Symptoms.	Eye.	Temperature.
1 M. E.	No.	Nauseated. Headache before op. Greatly increased after. Delirium.	Nystagmus Disk Injected.	Normal at op. 104° after.
n M. E.	No.	Vomiting. Spasm. Chill. Pain in Eye.		Normal on adm.
1 M. E.	No.	Complication by Labor.	Epidural abscess.	
	No.	5th day after 2nd op. Restless. Later convulsions.		Normal on adm. 2nd day 104° after op.
men Tympani stula into Anrior part of mp. Sphe. lobe.	No.			Normal on adm. 104° 2nd day after op.
	Pus and Exudate beneath entire dura.	Otorrhora. Pain in head.		99.8° on adm.
		History of furunc. of canal followed by pain in ear.	Coma Vigil Pupil dilated.	104° on adm.
		Before op. only headache. Shooting pains behind ears, 1st day after vomiting.	Optic Neuritis.	Normal on adm. for 4 days. 5th 103° and so to death.
	Blood vessels of brain congested. Pia studded with miliary tub.		Suddenly blind day before admission.	
	No.	Pain and delirium on admission. Head turned to left.		
	No.	Meningitis followed radical.		
	No.	2 Weeks hemicrania.		Normal on adm. P. 80 after op. 105°.
	Followed op. on nose Infection from B. Douch cup.	Comotose on admission.		
	Followed Radical op.			Normal on adm. and 4 days after op.
toid.	Marked leucocytosis Result of delayed op.	Intense pain ear septic lock mastoid tenderness sweats.		High.
	No.	At the last delirium.		
	No.	Delirium.		103° on adm.
	Rubber tissue used in dressing post wound closed at 2nd op. graft.	Vomiting.		Normal on adm. 104°
	Dura congested Plastic exudate on pia.	Signs of meningitis on admission. Head retracted twitching.		
	No.	Earache and otorrhoea 6 days. Pains and convulsions on left side constant.		
	Sinus Normal.	Before operation chill and vertigo. Unconscious 3 days after.		Below 101°.
	Meningitis.			
	Tb. Meningitis.	Convulsions. Delirium.		
Tegmen.	Tegmen Tymp. diseased. Polyps in ear. Pus on removing outer T.			
Tegmen.	Tegmen gone.			
		Vomiting. Stupor. Paralysis of right side. Twitching.	R. Pupil dilated.	104°. P. 120-156.
	No.	Facial paralysis followed op. Pain in right eye and right side of head.		Normal on adm. Temp. norm. on re-admission, rose to 103; once 104; pulse 54-78
		Vomiting. Pain in Back. Delirium.		Normal on adm. 105° at death.

FACIAL ASYMMETRY AS A POSSIBLE CAUSE OF DEFORMITY OF THE NASAL SEPTUM.*

BY HENRY L. SWAIN, M.D., NEW HAVEN, CONN.

During the last three years Drs. Brackett, Arnold, and Hirst, of the three successive graduating classes at the Yale Medical School, have, at my suggestion, and with the kindly supervision of Dr. G. G. MacCurdy, measured and studied some of the skulls of the Marsh collection in Peabody Museum at Yale University, with a view to bring out a little more prominently, by comparing the various races, some of the causes of the arching of the palate. The idea was that perhaps some possible relation might be discovered as existing between the shape of the skull and the arch of the palate. A number of interesting facts have come out in the course of the work, some of which I reported to you last year in a paper entitled "The Arch of the Palate." I will briefly recapitulate some sections of this article, referring you to the original for details and measurements, and then finish up with our final studies.

The incentive to the whole work was a well-developed doubt as to the importance of the role which adenoids and the consequent nasal stoppage had in narrowing and raising the arch of the palate. It has always been an accepted belief that if the palate should over-arch, the septum nasi would have insufficient space to grow to its full stature and hence would bend to accommodate itself, and it was more the latter idea of the relation of the over-arched palate to the septum than the palate itself which determined me in starting this three year study.

An early assumption was that, if adenoids were all important in producing changes in the bony framework which resulted in over-arching of the palate, a measurement of a series of skulls of non-adenoid races ought to develop that they had broader and shallower palates in the gross average, and that there would be fewer wide variations or extensive over-archings. Such measurements were made by Brackett[1] in a series of Hawaiian skulls, and it developed that they possessed a perfectly normal index as regards the relation of the height to the breadth of the palate. We assumed as normal what had been developed as the correct average by a large number of different observers. The individual variations from the normal were fully as great as existed in the tables of numerous observers consulted.

* Read before the Annual Meeting of the American Laryngological Association, held at Atlantic City, June 2, 3 and 4, 1904.

Alkan,[2] in Germany, measured among others some Malay and Negro skulls, finding an average very closely approximating the European standard. It therefore seemed fairly demonstrated that even in non-adenoid races high palates could exist, and surely in the Hawaiians and Malays no trace of suspicion could be thrown upon the adenoids as the possible cause. Furthermore, as these Hawaiians belonged to the original race long before any effects of civilization could have made themselves manifest, it is possible in a native race to have the same individual differences as are evident among recent civilized peoples.

Grosheintz,[3] whose methods Brackett followed, came to the conclusion that "A high and narrow palate is usually combined with a small development of the upper part of the face. Small nasal and orbital cavities are associated in the rule with highly arched palates. The highly arched palate usually depends upon a congenial racial peculiarity of the skull and not upon the later extra-uterine influences of nasal-stenosis." This last conclusion was certainly worthy of comment, especially when contrasted with the very general belief to the contrary.

Brackett's final conclusion from his study of the Hawaiians was that "While the height of the palate bears no absolute relation to the shape of the face, still a long, narrow face with high, narrow anterior nares and orbit more often exists with a high palate than with a low one."

Alkan's opinions next attracted my attention, following the conclusion of Brackett's work. He differed from the other observers, and presented findings in complete accord with the orthodox version. He said, "The hard palate of the new-born child is characterized by its shortness. With increasing age the height and breadth increase but slowly, while the length becomes proportionately rapidly greater. In people afflicted with adenoid vegetations we find on the average a high, long and narrow palate, *i. e.*, a form which does not represent the normal. The shape of the hard palate has no connection with the shape of the skull. Anomalies in the position of the teeth are of frequent occurrence in those individuals with deformities of the palate or the upper jaw, and may be looked upon as due to the latter." His work was at hand when we began to study the palates of the Flathead Indians, and his methods were followed absolutely, so as to be able to make accurate comparison, by Dr. Arnold in his work of last year.

The latter found that a deforming process like the flattening could not only profoundly distort the whole skull, but also affected the palate. The latter was broadened and flattened, giving a greatly

altered index. Alkan's index of the relation of the height to the breadth was 52.6, while the Flathead average was 33.4. Here also as among the Hawaiians there were wide differences in the height to be observed and chronicled in another presumably non-adenoid race. It seemed evident, then, that in a modified sense the shape of the skull, even though artificially altered, can and does affect the shape of the palate, even though there is no nasal stoppage whatever.

What seemed to us even more remarkable than the change in the palate, was a marked shortening and broadening of the nasal cavity, and while the height was thus lessened the septum was fully as straight as in other races. Hence it, the septum, so adjusted its growth as to adapt itself to its somewhat more cramped quarters.

At this time it was not possible for Arnold to measure all the changes that had taken place in the nasal cavity, so the matter has been taken up this year by Hurst,[5] and he has done a very large amount of work in the comparative measurements of the nasal cavities, with special attention to the posterior choanæ of the Hawaiians and the Flatheads. The former, it will be remembered, we proved in the previous work were an exceptionally fine type of well-developed skulls, all their measurements conforming very closely to the European standards.

We attempted first to determine the proportion of general deviation of the two races. In both, among the adults, there were 19 per cent. of straight septa. The Hawaiians had 10 per cent. of posterior deviations, while the Flatheads had 12 per cent. among the adults. In the middle third of the septum, which includes practically the anterior part of the bony septum in our method of comparison, the adult Hawaiian had 71 per cent. deflections, and the adult Flatheads 68 per cent., which you see makes the difference between the two races very immaterial indeed, inasmuch as there were four times as many Flatheads examined as there were Hawaiians. Measurements of a larger number of Hawaiian skulls would still further reduce this slight difference. Among the young Flatheads fully 50 per cent. possessed straight septa, with 41 per cent. having anterior deflections, so that the probabilities are that the rougher life of the adult Indian developed by traumatism many deviations from normal.

It will be seen that in both races 10 per cent. and 12 per cent. of deviations of the posterior septum were recorded. This does not include exostosis or other forms of thickening, but refers to an actual departure from the straight vertical line. However, in both races this was scarcely ever more than a millimeter, and in the vast

majority of instances was under a millimeter, so that the general working rule holds good of even these original races, that the posterior edge of the septum rarely deviates noticeably from a straight line, a point I have been much interested in developing.

The vertical measurement of the posterior nares in both races brought out the adult Hawaiian to be 20.9 millimeters and the adult Flathead, 19.1. The breadth of the posterior nares, taken halfway between the top and bottom of the opening, was 13.9 in the Hawaiian, and 14.2 in the adult Flathead, making an index of the adult Hawaiians of 66.4 as against 74.3, a very considerable difference.

Now the variations from the average were vastly greater among the Flatheads than among the Hawaiians. While it is noticed that the average adult Hawaiian was 20.9, some of the Flatheads were as low as 15.1 millimeters, so that the difference between the lowest Flathead and the highest Hawaiian, which is 23 millimeters, is over 8 millimeters.

Inasmuch as frequently asymmetry in the width of the two posterior choanæ existed among the Flatheads, in order to strike an average which was anything like as accurate as were the Hawaiian measurements, it was necessary to measure across the entire posterior nares from one pterygoid process to another and divide that by two. A similar but much smaller difference was found in comparing the height of the choanæ of the two races. The combined width among the adult Hawaiians of the two posterior nares was, in the median position between the top and the bottom, never more than 32, the smallest being 26, which occurred a number of times. Among the adult Flatheads only occasionally did they measure as narrow as 27, and the widest was 37, so that between the lowest Hawaiian and the highest Flathead very large differences existed.

Now, it will be seen by comparison of the table as printed that, whereas it is comparatively rarely that any deviations of the posterior septum occurred, not more than 10 per cent. in the average of the two races, a vastly greater proportion of differences in the actual width and height of the two posterior choanæ existed among the adults.

Among the young Hawaiians there was no vertical or horizontal asymmetry, and only in 2.6 per cent. of the young Flatheads was there any difference in the vertical dimensions. In the horizontal direction, however, among the young Flatheads there was a difference in the two sides in 36.1 per cent., which is nearly half. Among the adult Hawaiians there was a difference in the vertical dimensions in 25 per cent., and in the width there was a difference of 61.1. When you average up the amount of asymmetry by taking the total

differences, adding them up, and dividing by the entire number examined, it brings the entire amount of difference of asymmetry in the width of the Hawaiian posterior choanæ as .6 per cent. Among the Flatheads the story is quite different. In 46.7 per cent. the adults possessed differences in the vertical measurements, and 76.9 per cent., *i. e.*, over three-fourths, had differences in the width between the two sides. Furthermore the amount of variation differed greatly, so that when you averaged up the total amount of asymmetry in the vertical dimensions it was .53. The total amount of average difference in the width among the Flatheads was .9 per cent., half as much again as among the Hawaiians. The greatest amount of difference between the two sides in the width among the Flatheads was 5 millimeters, while it never exceeded 2 among the Hawaiians, and in by far the majority of cases was only 1 millimeter.

It seems to me most interesting and worthy of further mention that there was no asymmetry whatsoever among the young Hawaiians, and no vertical asymmetry to amount to anything among the young Flatheads, and furthermore that 50 per cent. of the young Flatheads had absolutely straight septa. This asymmetry among the adult Flatheads is even more pronounced when the whole skull is taken into consideration, and frequently the whole of one half of the skull would be greater than the other. This led to a very peculiar facial development, the whole of one side of the face being greater than the other. In these cases of exaggerated growth of one side of the head there was invariably produced a considerable bend in the septum. It seemed as though the smaller side acted as a sort of restraining influence upon the other side of the septum, causing the effect of a string upon a bow, as it were, as is indicated in the rough drawing that I pass around, and the bending was either in the way of an arching toward the more powerful side, or it took a compensatory form, both varieties existing in about equal degree.

Here, therefore, is a new form of developmental bend. As we have generally construed the matter, there is but one form of developmental bend, namely, that produced by the over-arching of the palate. Now we have to add to that the possibility of a bend in the septum being produced by the over-growth of one side as compared with the other, making Class Two of developmental bends.

The fact that asymmetry of the posterior choanæ, even though small in amount, exists and frequently, as we have found it, by actual measurement among the Sandwich Islanders, and finding that this also takes place in the face leads to the probable assumption that facial asymmetry when naturally produced (as against the artificial form in the Flathead) may also cause changes to take place in the septum nasi.

While these studies were developing a comparison between the Flatheads and the Hawaiians, it was with considerable interest that the work of Bentzen came to our attention. He was certainly most painstaking and thorough in developing the points which he tried to prove. One purpose of his investigation was to develop what effect could be traced to rachitis, first upon the face, and second what proportion of high, narrow faces had high palates, and the reverse. His final summing up showed that he believed that he had no right to put the matter any more strongly than had Brackett, as already quoted, that the highly arched palate is more often found in skulls with high, narrow faces than in the reverse type. To this Bentzen[6] added the interesting observation that before dentition children's skulls are frequently absolutely the reverse. He also stated as his belief that when all was said hereditary tendencies produced a given type at birth. If adenoids or other causes produced nasal disuse and mouth breathing, that that particular palate would become narrower

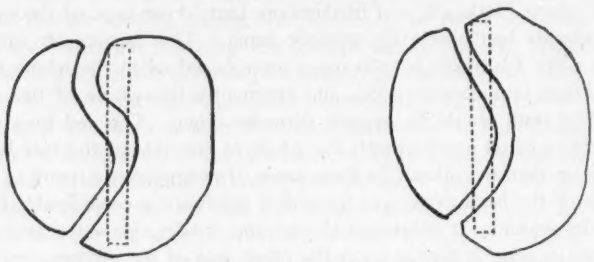

Fig. 1. Effect of overgrowth of one side shown in horizontal section.

and usually, but not always, higher than it would have been had not such stoppage occurred. In those with a natural tendency to narrowing and in the narrow and high faced this would produce greater changes than in the naturally broad faced, and the amount of narrowing would be in direct relation to the length of time the nasal stoppage existed.

Regarding the deviations of the nasal septum, he found that septum deviations occurred in adults possessed of adenoids, (which assumes that the latter must have existed for many years,) in 16.5 per cent. and in those who had normal conditions in the nasopharynx in 15.6 per cent. "This," he says, "absolutely does not allow of any conclusion. Certainly it can not be assumed that the septum deviation was favored by the increase in the height of the palate." He even asked the question, "May we not assume that the septum deviation was primary rather than secondary?" And inasmuch as in the

cases where there were no adenoid vegetations there was also found the over-arched palate, in the cases where the septum deviations existed he rather pertinently inquires, "May not the septum deviation actually produce the high palate?" If this is the case, it adds one more to the possible etiological factors.

Regarding the possibility of the leptoprosopic skull being the cause of the over-arching of the palate as well as concerning the influence of rachitis he believes that there could be in neither a direct connection. Inasmuch, however, as the individuals with deviated nasal septa are in the vast majority of cases leptoprosopic, we are right in assuming a close connection between the two, and therefore there arises the possibility that the leptoprosopia may through the production of deviations of the septum play a role in the development

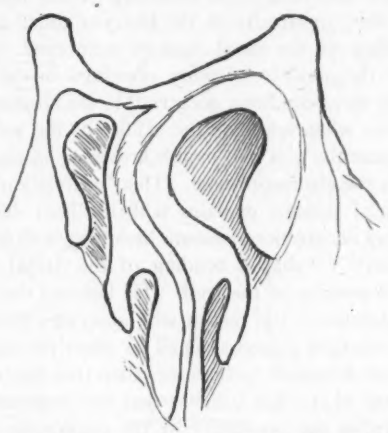

Fig. 2. The effect of overgrowth on one side shown in vertical section.

of the high palate. It is following this that he comes to the illuminating conclusion that if at the last he mentioned as contributing to the etiology of the over-arched palate the inherited predisposition, he was bringing forward the most potential factor which is doubtless always present.

The last candidate for our consideration is Buser.[7] He has gone at the subject in a very enthusiastic way, but with a distinct mental bias toward the observations of Siebenmann. It is assumed that there is a law of "correlation," as it is called, between the shape of the skull and the form of the face, nose, and palate, and the effort has been to prove that this assumption is correct, using involved reasoning based upon very careful and numerous measurements. He

measured the heads of 514 living persons who were in possession of good teeth, and on the basis of this believes he has discovered that there is certainly a "correlation" in the form of the face, skeleton, the bony nasal openings and the hard palate, and that one may assume the existence of two types of construction in the formation of the facial skeleton, namely, the leptoprosopic, high and narrow, and the chamæprosopic, the low and broad. In the former, in connection with the high and narrow, bony nasal openings you find the high and narrow palate formation and a narrow dental arch. In these the second dentition has difficulty in finding the necessary space for the proper position of the teeth. The second form of face develops, together with a broad opening to the nasal chambers, a palate of considerable breadth and a broad "U" shaped dental arch.

Through the interference in breathing which occurs most frequently with the hypertrophy of the pharynx tonsil and the accompanying swelling of the nasal mucous membrane, there occurs a narrowing of the small respiratory openings in the leptoprosopic skull, while the same condition occurring in the chamæprosopic often has no influence whatever upon the calibre of the wide nasal channels, so that naturally you find mouth breathing in the leptoprosopic oftener that in the chamæprosopic. This "correlation" in the structure of the facial skeleton explains with the least difficulty the extremely frequent occurrence of mouth breathing with the high palate, the narrow and "V" shaped bending of the dental arch, and the anomaly of the position of the teeth. He believes that "correlation" in the facial skeleton is the reason why observers find among those that have an enlarged pharynx tonsil so often the high palate and narrow arch and deformed teeth rather than that the hypertrophy itself is the cause of it. He believes that the anatomical conditions absolutely negative the possibility of the compressing influence of the slightly tightened cheek and mastication muscles producing changes in the chape of the facial skeleton.

Consequently we can briefly sum up his ideas in the statement that inherent racial peculiarities of the skull produced the conditions, rather than that any possible change could result from the fact of the nasal stoppage altering or even exaggerating the changes in the growth of the face.

Taking it all in all, his position is the most radical of any of the observers that I have thoroughly studied. Leaving aside his views as regards the palate, it certainly would seem impossible that the nasal stoppage should exist through the growing period of the child and have absolutely no effect whatever upon the facial development. Whether the septum deviates independently from the arch of the

palate or not we will, also, lay aside for the present, but it seems to me that the arguments brought forward by Buser leave one in a very helpless condition, and fail to explain certain facts that are positively observed. For instance, I have no doubt that a careful observation of nasal conditions existing previous to and following the work of the modern orthodentist will show that changes in the dental arch do widen the palate and do give added nasal space and better nasal breathing. If that is the case, then the obverse must be equally true, that changes do take place in the face from pathological conditions, and I still for the present incline to Bentzen's more moderate view as before expressed in this article.

Alkan observed in his paper that among new-born children there were certain palates that had already begun to assume a tendency toward high-arching. Buser very properly concluded that, there-

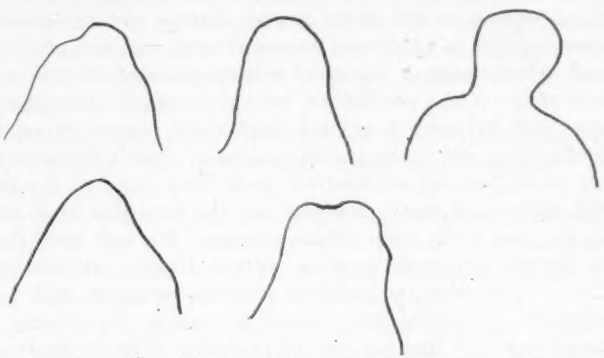

Fig. 3. Peculiar distortions of dental arch which are also accompanied by equivalent changes in the hard palate.

fore, all high-arched palates can not by any means be said to depend upon the presence of adenoids. It does not follow that adenoids which exist for a long time have no influence upon the nose, but it is certain that that effect has been over-estimated in years past, and that by all such studies as these a more correct estimate may eventually be brought about.

Now to return to the anatomical make-up of the face, the nose, and the septum. The septum is the last of the bones to completely ossify. The facial bones, including the superior maxillary and the turbinate bones, all are ossified before it.

It has been shown that among the Flatheads and among the Hawaiians at least facial asymmetry does exist, and that with facial asymmetry you have a change in the septum not from effects on the

palate alone, but by the over-growth of one side overpowering and bending around the smaller and weaker side.

Since the discovery, nearly a year ago, of this relation, the possibility of facial asymmetry contributing toward bends in the deviations of the septum, I have been greatly impressed by the enormous number of people the one side of whose face is different from the other. In a great many instances, without attempting to tabulate or estimate in figures, I have observed that bends of the septum exist bearing a certain relationship to the greater side. This facial irregularity is almost invariably present in the markedly leptoprosopic and would readily account for the existence of asymmetrical arching of palates and nasal narrowing. The observation of any large number of faces in any gathering of people will show you that there are frequent instances where not only is one side of the skull and face greater in one direction but also in all, so that it is perfectly easy to see that vertical as well as the anterio-posterior and the lateral dimensions differ, in which case the same line of reasoning as we deduced, which makes it possible for horizontal deviation to occur, would render it also possible for vertical deviation. This fact, together with Bentzen's belief and Buser's very radical conception, would tend to add to the possible causes of septum deviation this other factor, namely, an inherited predestined shape of the skull, which without necessarily bringing into the discussion at all nasal stoppage, may bring about septum changes. We may have, therefore, septum deviations occuring without trauma, without overarching of the palate, and without adenoids interfering with nasal respiration. Admitting these factors as possible, immediately the consequences of a hanging jaw as producing a narrowing of the face sinks into complete insignificance. It would seem impossible that, with the strongly buttressed bones which are made to stand the strain of the strong mastication muscles, the mere weight of the slightly depressed lower jaw should drag the face out of proportion and distort parts which withstand the stronger action of the other muscles. Yet this is just what is the fact if we lay any weight to the idea that mouth breathing causes changes in the bony framework of the face and palate by the mere lateral pressure of the cheek muscles. Talbot[8] strongly contends this point, and well says that by no possible stretch of the imagination could it be conceived that the irregular curves of the dental arch, which means, of course, also changes in the shape of the palate, were produced by a perfectly equally divided weight pulling equally on both sides of the face, as is the case of the hanging lower jaw. There are no muscles or bands which could possibly be considered as performing this distor-

tion when you take into proper estimation the attachments of the muscles themselves.

If I then stop and sum up what may logically be deduced from this series of studies which we have made on the skulls of the Hawaiian and the Flathead, together with much which has in the meantime appeared in literature, we can not escape the following conclusions:

Adenoid stoppage does not always, and may never, cause over-arching of the palate. Over-arching of the palate does not always produce bends of the septum. Over-arched palates and bent septa often occur together, and each is more frequent in skulls which are leptoprosopic. Leptoprosopic skulls and faces almost neevr exist in a marked degree without some distortion or over-arching in the palate and changes in the nasal cavity. In a young child about to develop into marked leptoprosopia, pronounced or complete nasal stoppage by adenoids can not fail to add to the degree of the deformity by interfering with the normal growth of the superior maxillary bones, not the least item in which is the stunted growth of the maxillary sinuses from lack of proper aeration and air interchanging in the nose.

If the first teeth are early removed and the dental arch disturbed, then the palate will usually more easily become narrowed and pointed in its own arch.

We would rule out of the causative influences toward over-arching of the palate the dragging on the cheek muscles, resulting from a dependent lower jaw in mouth breathers, although in a previous paper some slight weight is placed on this item.

When, as a result of inherent tendencies, aided and abetted by nasal stoppage, there has been produced a smaller nose than normally would be correlated, then the septum nasi, as the last bone to be fully ossified, may cease to be perfectly straight, because it must find a place in a structure harder than itself. It must therefore yield to the irregularities in the growth of the other bones.

The study of the Flatheads has demonstrated how great an influence the distortion of the shape of the whole skull may have upon the nasal cavity as a whole and also upon the palate, and that the asymmetry of the skull appears to have produced not only a difference in the size of the two parts of the nose, but also bends in the septum. Observations of the living show exactly such bends to be present when there is marked facial asymmetry, and that facial asymmetry is very often present.

This all brings us back to what Welcker is reported by Bentzen to have said, in 1882, that asymmetrical development of the entire bony nasal cavity, together with the hard palate, was the cause of

septum deviations, and to this we will add that the causes of asymmetrical development are more often inherited or congenital than acquired.

SEPTA AND POSTERIOR NARES COMPARATIVE TABLE.

SUMMARY OF RESULTS AS MEASURED BY DR. J. H. HURST.

RACE.	Y. H.	A. H.	Y. F.	A. F.
Skulls measured	9	39	36	169
SEPTA.				
Straight septa	—	19%	50%	19%
Posterior deflection	—	10%	9%	12%
Mid deflection only	—	71%	41%	68%
POSTERIOR NARES.				
Vertical average	18.3	20.9	16.0	19.1
Horizontal average	12.8	13.9	12.4	14.2
Index	69.9	66.4	77.5	74.3
Vertical asymmetrical	nil	25.0%	2.6%	46.7%
Horizontally asymmetrical	nil	61.1%	36.1%	76.9%
Average vertical asymmetry	nil	.28	.02	.53
Average horizontal asymmetry	nil	.60	.27	.90

Y. H.—Young Hawaiian.
A. H.—Adult Hawaiian.
Y. F.—Young Flathead Indian.
A. F.—Adult Flathead Indian.
All measures are expressed in millimeters.

DISCUSSION.

Dr. JOHN O. ROE considered this subject extremely interesting. He said Dr. Swain has very clearly pointed out the conclusions which have previously been reached, that the purer the race, the straighter the septum; the more composite the race, or the ancestral tree, the more often is encountered a deflected septum. Heredity, therefore, plays an important part in this connection. It is a well recognized fact that a child may inherit from one parent one peculiar feature and from the other another peculiar feature. If the child should therefore happen to inherit the nose from one parent, and the mouth and jaws from another, the septum may not therefore fit the place assigned to it, nor have sufficient room for proper development, and therefore of necessity becomes deformed. In the evolutionary changes that take place in the mixture of the races, we might well say with Pontiquet, "that a man has only exceptionally the septum which belongs to him."

Defective development also plays an important part in the ethnology of the deviations of the septum. The septum, as we know, is composed of two plates, each having its centre of development. If

these plates grow unequally, because of hyper-nutrition of one, or defective nutrition of the other, according to the law of compensation, a deflected septum results. Also, if a disproportionate development of the bones of the face takes place, we may have what has been designated as a "scoliosis of the face," with which is invariably associated a deviated septum.

There are a great many conditions to be considered as etiological factors, the most important of which, however, are hereditary and defective development. Diseases of the nose and naso-pharynx often play an important part in the proper development of the nose. Obstructions of the nasal passages interfering with the respiratory function of the nose play a very important part in the influencing of its developments. This is often seen in children afflicted with adenoids. Dr. Roe has in many instances seen one child in a family which had adenoids and which also had a deviated septum, an imperfectly developed nose and a high arched palate, whereas none of these conditions were present in those having unobstructed nasal respiration.

Dr. A. COOLIDGE, JR., stated that when the Association met in New Haven cases were reported by him of congenital occlusion of the posterior choanæ by bony plates. Some of these cases were unilateral, others bilateral. As this condition was congenital there had been absolutely no breathing up to the time the patients came to be treated, at which time the bony plate was found and removed. If mouth breathing or breathing through one side only of the nose always influenced the shape of the skull, these cases would be markedly deformed. All of these patients were adults and had either not breathed through the nose at all or only through one side, yet they did not show any particular tendency to high arch or deviation of the septum. One or two cases of bilateral occlusion were observed in which there was marked deviation of the septum, which deviation must therefore have been due to some other cause than obstructed nasal breathing. If complete occlusion of the nares does not always cause high arching of the palate, adenoids may easily fail to produce this result.

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A CASE SHOWING UNUSUAL DEVELOPMENT OF THE FRONTAL SINUSES.

BY E. C. ELLETT, M.D., MEMPHIS, TENN.

On Jan. 4th, 1904, I saw Mrs. M. in consultation with Dr. Meyer for severe left supra-orbital pain of one week's duration. The region of the left frontal sinus was tender, and on passing a canula into the sinus from the nose some pus was washed out and the pain relieved. Subsequently the patient was seen at my office when the transillumination tests showed the unusual development of the frontal sinuses indicated in the illustration. The suppuration ceased after several weeks' treatment by irrigation, and until it did the con-

trast between the two sides was striking. After recovery the sinuses were illuminated in the usual manner and their outlines marked, after which the photograph was taken. The extreme width of the light area was five and half inches, height from the glabella two and a quarter inches. Such cases are sufficiently uncommon to justify the recording of this one.

Randolph Building.

TUBERCULOSIS LOCALIZED IN THE THIRD TONSIL.

BY C. S. MEANS, B.S., M.D., COLUMBUS, OHIO.

On Dec. 14th, Dr. K. came to my office giving history as follows, hemorrhages, fever, night sweats, loss of appetite, rapid loss of flesh, great languor and general depression.

His age is 29 years, graduated in medicine in 1898. Since then has had a very large country practice, necessitating a great amount of work and loss of rest.

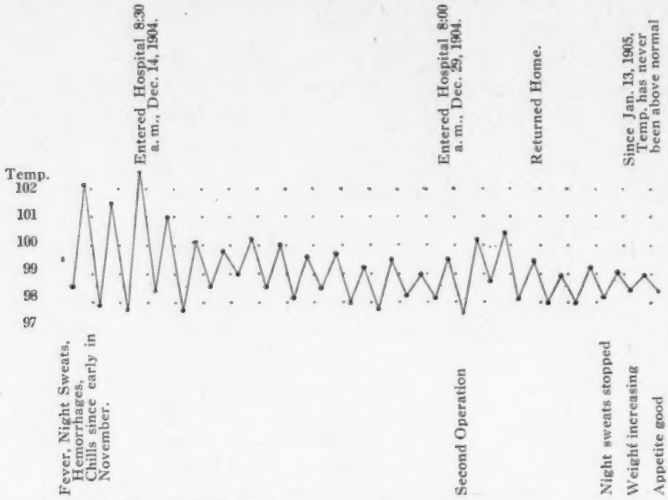
In October, 1904, he began to lack ambition, appetite was poor, he lost weight, could not do the work that he formerly did without getting very tired. About last of October, he began to have gaging and coughing spells, especially in the morning when rising. It seemed as though there was something in his throat that would make him cough. This was soon followed by hemorrhages. Each time he would wretch or cough the sputum would be streaked with blood, usually dark and clotted, but this gradually grew worse and hemorrhage became more profuse and the blood of a lighter color. Night sweats began to appear, his temperature in the afternoon ran along about 99.5° F., chills, usually worse at night. The night sweats increased in severity until they were very profuse. He would rise in the morning with excessive coughing, and after his coughing spell was over, he was unable to eat any breakfast or scarcely able to get around on account of extreme weakness. On Dec. 12th, his temperature was running 103.5° F. and he was confined to his bed for three days. Appetite was poor and sweats profuse. After this, he could bring blood at any time he would clear his throat or cough. He would also be awakened from his sleep by a choking sensation and rattling in the throat. Then he would cough and expel a considerable amount of blood. This would always give him relief. He had lost fifteen pounds in weight. He is a man six feet high and weighs from 175 to 180 pounds; family history excellent, being one of nine children, all living. Father and mother well.

He was treated with various remedies by his fellow practitioners in the town in which he was located, took immense quantities of quinine, thinking it was malaria, but he was gradually growing worse and felt that he was doomed to die unless this could be stopped very shortly.

He came to my office Dec. 14th, 1904. I immediately had his lungs examined by Drs. D. N. Kinsman and W. J. Means. They

both reported negative. Nothing to be found in his lungs. Bacteriological examination negative. I then examined his throat and found throat normal except a large Luschka's or third tonsil with small clots of blood at several points over its surface, no breaking down or ulcerations. The tonsil was just about the same in its general appearance as we find in many throats, yet from his history, and from these points of hemorrhage, I explained to him that it was worth while at least to remove a portion of this tonsil and have it

DOCTOR K. PROTESTANT HOSPITAL, COLUMBUS, O., DEC. 14



1904. October 1st, general malaise.
1904. October 15th, Losing flesh; appetite poor; hectic chills and fever slight.
1904. November 1st, Coughing in morning and sputum streaked with blood plus above.
1904. November last, Coughing; hemorrhages more profuse; temperature reaches 102 to 103 in afternoon.
1904. December 15th, Coughing; hemorrhages more profuse; lost 10 or 12 pounds.
1905. January 15th, No rise in temperature; no cough; gaining flesh; good appetite.
1905. February, Well; gained normal weight.

examined by the bacteriologist. Dec. 15th under cocaine anesthesia I removed a portion of this tonsil with a curette. It being so painful to him in his weakened condition he was wholly unable to stand a complete removal. However, the portion I did remove was examined by Dr. Scott who found numerous tubercle bacilli present in the section of tissue examined. None had been found in the sputum before. No test on the animal was made because too much time would be consumed before the result could be found. I ordered him

treated with gargles of anti-septic throat washes and an application of 10% argyrol to the diseased points.

He returned home the next day, and as he put it, felt greatly relieved from the operation that I had done. His temperature dropped to almost normal, (See Chart), his appetite increased and he was generally in a very much improved condition. I explained to him that if this was really the seat of trouble, it was imperative that he should return and have a complete removal of the diseased tissue. This he did, Dec. 29th. Under a general anesthetic, I removed the remainder of the adenoid tissue.

He has never had a rise in temperature above 99° F. since three days after that removal. I have had a daily record of his temperature since that time until Jan. 20th, when he felt so well that he said there was no use in taking his temperature any more, that he had never found it above 99° F. for several days. He is regaining all the flesh he lost and says that he is feeling better than he has for years. A letter from him, Feb. 20th, states he is well with no symptoms of any trouble and that he has regained his normal weight.

I appreciate that this is too short a time to say that we have made a perfect cure, but I reported it for two reasons, first, that it is a very interesting case to me; second, that I believe it proves that we have more cases of localized tuberculosis in the tonsils than is generally discovered.

In all the literature that I have been able to find I have seen but one case resembling this one and it was reported cured.

If we can discover the primary lesion of tuberculosis in the throat, as this was discovered, I believe a great majority of our cases can be cured before the lungs become affected; and therefore, we can lower the mortality in this dread disease.

A FOREIGN BODY SWALLOWED BY A CHILD SEVENTEEN WEEKS OLD.

A CASE OF SO-CALLED HAIRY TONGUE.

BY RICHARD H. JOHNSTON, M.D., BALTIMORE, MD.

1. In the latter part of 1903, a mother brought her baby to the Presbyterian Hospital for professional advice. The history as given by her was as follows: The baby had been healthy since birth. A few days before when it was just 17 weeks old, it had gotten hold of a round button with a sharp pointed brass pin on its back for attaching it to the coat and had swallowed it. The button was an advertisement of the Morning Herald and was probably not quite half an inch in diameter while the pin was perhaps a little longer, projecting below the border of the button. In great alarm, the mother took the child at once to a hospital where the use of the X-Rays revealed the foreign body in the œsophagus. The operation of œsophagotomy was proposed for its removal. This was declined. A careful examination of the child as to its throat and its general physical condition showed nothing abnormal. Since the child seemed as bright as babies usually are at its tender age and there were no symptoms of œsophageal obstruction, the mother was advised to do nothing unless some symptoms developed when she was to bring the child to the hospital at once. She was told to watch the stools closely as there was a probability that the button might be passed at any time. The case had passed entirely out of my memory when ten weeks later the woman appeared at the hospital without the child. She approached me with a broad smile on her face and showed me the button which the child had passed that day. She reported that the baby was apparently none the worse for its experience. One year later the condition of the infant was good and there were no symptoms to indicate that there had been any ill effects from the passage of the button through the intestines. Considering the age of the patient and the large size of the foreign body the case is rather a remarkable one. Had the operation of œsophagotomy been performed at so early an age, it is probable that the child would not have recovered.

2. In an article published in the *New York and Philadelphia Medical Journal* about two years ago, I described the rare condition known as hairy tongue. The patient was an elderly man who had experienced a persistent tickling sensation in the roof of his mouth.

Examination revealed a circumscribed bunch of hairs on the dorsum of his tongue which caused the symptom. Recently I have seen another case more peculiar in some respects than the first. The patient was a colored male, 35 years old, who presented himself at the Presbyterian Hospital with a sore throat. The lesion responsible for the pain on swallowing was a large ulcer on the right tonsil. Incidentally, a peculiar furred condition of the tongue was noted. The dorsum of the organ was of a black color and the filiform papillæ were very much thickened and prolonged. All over the tongue the papillæ could be raised with the probe until the dorsum resembled the back of a porcupine. The base of each papilla was very thick and projecting from this was a thin prolongation resembling somewhat a hair in appearance. The large number of the papillæ gave the impression of a mass of hairs growing on the tongue. The black discoloration seemed to be confined to the prolongations since the thickened bases were of a pale color. The condition was no doubt akin to or identical with the so-called hairy tongue. The patient was given mixed treatment for his ulceration and told to return in one week's time. The next week he returned the furred condition of the tongue had entirely disappeared. Inquiry revealed the fact that there had never been any abnormal sensations in the mouth nor had the patient ever observed that there was anything wrong with his tongue. He gave no history of indigestion which is sometimes seen in these cases of hairy tongue. Whether there was any connection between the internal medication and the disappearance of the trouble, I do not know, but it would be well to bear it in mind in the therapy of such cases. Since the report of my first case four or five others have appeared in the literature bringing the total number up to about forty. The various theories as to its causation and the methods of treatment are referred to in my former article.

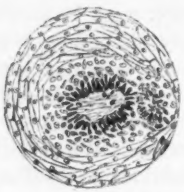
819 Park Ave.

PAPILLOMA OF THE LINGUAL TONSIL.

BY RICHARD H. JOHNSTON, M.D., BALTIMORE, MD.

All tumors of the lingual tonsil are rare. In looking up the literature of malignant tumors at the base of the tongue, I could find only six sarcomata and among 80 epitheliomata of the tongue collected by Butlin one was located in this region. Sendziak has since reported another primary epithelioma. Some months ago I had the good fortune to observe a growth of the lingual tonsil, undoubtedly benign, which I wish to add to the small collection already reported.

The patient was a male, 30 years old, who came to the University of Maryland Hospital complaining of an obstinate hoarseness of three or four months' duration. His family history was good. He



had contracted syphilis five years before, but with prompt treatment, all symptoms had disappeared. Eighteen months later, he married and, at the time of his entrance into the hospital, had two healthy children. His wife had never had a miscarriage. The examination of his nose, naso-pharynx and pharynx showed nothing of interest. The lingual tonsil was hypertrophied on both sides with a deep furrow in the middle line. On the left side there was a tumor about the size of a large pea, pale yellow in color, freely movable with the probe and attached by a narrow pedicle to the lingual tonsil. The patient complained of a sense of fullness in the left side of the throat and an aggravating cough, which symptoms were evidently caused by the presence of the tumor. On the epiglottis, there was a small superficial ulcer. The vocal cords were red and thickened and showed anteriorly two small ulcerations. The tumor of the lingual tonsil was removed with the snare. Microscopically it had the appearance of a papilloma. After hardening in alcohol, it was embedded in celloidin. Sections were stained in hæmotoxylon and

eosin. The microscope revealed a tumor made up of a number of papillæ, each consisting of a central mass of connective tissue surrounded by cylindrical, cuboidal or oval and squamous epithelium from within outward. In the connective tissue a few blood vessels could be seen. The diagnosis was benign papilloma of the lingual tonsil.

The literature on these tumors is scant. Beausoleil, Michael and Bull have reported cases. In Michael's case there was a diffuse papillomatosis of the larynx. In Bull's case a papilloma of the epiglottis accompanied the tumor of the lingual tonsil. All authorities agree that such growths are seldom seen. The lingual tonsil like the other tonsils does not seem to be a favorable soil for the formation and development of growths either benign or malignant. Schmidt is inclined to look upon papillomata of the tongue with suspicion since, in his experience, they are nearly always followed by the development of malignant growths.

819 Park Ave.

EPITHELIOMA OF THE FAUCIAL TONSIL.

BY RICHARD H. JOHNSTON, M.D., BALTIMORE, MD.

During the fall of 1904, there appeared at the Presbyterian Hospital, M. T., 65 years old, complaining of a sore throat of long duration. He had been treated at different hospitals with no benefit. For many years he had smoked a pipe constantly, always holding the stem in the right side of his mouth. Examination of the throat revealed at the site of the right faucial tonsil a large fungoid mass with a deep ulceration. The edges of the ulcer were undermined and sinuous while the base was covered with a thick, whitish secretion. The glands in the neck were greatly enlarged. The ulceration involved the pillars and the soft palate. A small piece of the mass was excised, hardened in alcohol, embedded in celloidin and examined with the microscope. The section presented the appearance of a typical epithelioma, the areas of cut off epithelium being numerous. The appearance of the tumor and the size of the glands showed that death was not very far off so no operation was advised. As a forlorn hope, the patient was treated with the X-Rays at the University of Maryland Hospital. He was given a number of exposures and for a time the growth seemed to diminish in size. The improvement was, however, only temporary and about six months later, the patient succumbed from exhaustion. The connection between smoking and the development of cancer in the mouth seems clearly proven. In my experience the pipe is more frequently causative than the cigar or cigarette. I have recently seen an epithelioma of the cheek, hard and soft palates, in a man, 68 years old, where there was a definite history of smoking a pipe for many years. Schmidt does not think that smoking alone is sufficient to cause cancer but admits that it may weaken a soil that was already susceptible to the development of the neoplasm. The prognosis of such cases is of course bad, since operation is almost certain to be followed by rapid recurrence.

819 Park Ave.

SOCIETY PROCEEDINGS.

NEW YORK ACADEMY OF MEDICINE.

SECTION ON LARYNGOLOGY AND RHINOLOGY.

Stated Meeting, May 24, 1905.

Dr. LEWIS A. COFFIN, *Chairman.*

PRESENTATION OF CASES.

Unilateral Clonic Spasm of the Pharynx and Soft Palate.

Dr. ED. B. COBURN: The patient, a female, aged 43, of French descent came to me two months ago complaining that her voice was hoarse and tired easily, that she spoke with difficulty and had a throbbing and beating in the throat which was very unpleasant. The left side of her throat ached, as she expressed it. The attack began during the Christmas holidays as a cold which has continued, she says, to the present time and she still sneezes every day. She is conscious of a twitching in the throat; and, about noon time daily, the condition seems to get worse, there is more difficulty in speaking, the ache is more severe and vision becomes slightly blurred. This exacerbation of the symptoms passes off in about two hours. There is slight cough at night. A desire to swallow is almost constant and eating of very hot or very cold food causes a coughing and strangling. The left sterno-cleido-mastoid and trapezius muscles are tender to pressure. She complains of an ache in the left ear occasionally, alternating with pain in the other ear. Going up stairs causes a wheezing and difficulty in breathing (a smothering sensation). She says her health has always been good though she has been troubled with neuralgia of the temples since childhood and has had malaria of the "dumb ague" type. About two years ago, she received a nervous shock from a brother's sudden death and became unconscious and remained so for forty-eight hours. Just after this, she lost her voice suddenly and completely but regained it suddenly after three months treatment. She believes that she has not entirely recovered from the nervous prostration caused by this shock. The patient's mother and three brothers all died suddenly from heart disease. The patient is said to have a weak heart but no lesion and I have been unable to find any. Two sisters died from cancer. The menopause was passed a year ago and the only peculiarity of her menstrual life was a bleeding from the nose and mouth at such

periods, when she was a girl. There are no symptoms referable to the sexual organs. Constipation is troublesome. This winter she has had rheumatism of the hands, wrists and knees. There is no history of specific disease. There is no ataxia, but the knee jerks are exaggerated. An examination of the patient's throat reveals peculiar rhythmic motion of the left posterior wall of the pharynx, most marked at the lower part. There is also a slight synchronous movement (contraction) of the soft palate and uvula. These contractions are irregular but occur from 100 to 150 times a minute. There is slight enlargement of the left tonsil and a few hypertrophic spots on the pharyngeal wall. There is no discharge from the nose, throat or lungs. Examination of the nose is negative. The membrana tympani show some calcareous deposits but no redness. There is no hyperæsthesia of the pharynx. The treatment has been antirheumatic, anti-specific, and with strychnia, with mild sprays and gargles. The patient says she feels better, but I have observed no marked change.

DISCUSSION.

Dr. LEDERMAN said that he had noted that the spasm could be slightly restricted by pressure of the fingers on the pharyngeal wall.

Dr. QUINLAN stated that this was the third case of this kind he had seen, the other two being women in middle life who were approaching their menopause, and that such manifestations, not only sensory but motor, often occur at that period. Both women were in a very much disturbed and neurotic condition at the time, but both cleared up two years after the menopause was established. It was certainly a very interesting subject.

Two Cases: I. Pachydermia Laryngis of Doubtful Origin.
II. Sarcoma of the Nose.

Dr. HARRIS: *Case I.* A woman, 38 years of age, with a perfectly good history up to last August, the beginning of her present trouble. This commenced with a cough, which has persisted up to the present time. When the doctor first saw her a week ago, she stated that she had taken all kinds of cough mixtures and that her throat had been treated in various ways, including the galvanic cautery, without relief. His first examination revealed nothing in the chest to indicate tuberculosis; but later listening to her chest, he noted a number of very fine rales, not limited to the apices, her pulse ran a little over 100, and her temperature was normal, but she states that there has been some elevation of temperature at times. There has been no loss of weight, but a great loss of strength and some collapse in the last few weeks. The gentlemen had seen the thickening in the pos-

terior commissures, which to the speaker suggested only one of two things, tuberculosis or syphilis. He had seen nothing to suggest lues, and the patient had not been put under anti-specific treatment. He thought that this thickening was simply a pachydermia due to a lesion elsewhere. The sputum had been examined four times, with negative results, and the results from X-Ray examination were also negative. The questions to be decided were, what is the lesion, and what treatment is demanded? There was considerable to suggest a pachydermia due to the condition of the nose and throat. Dr. Coffin says that he has seen tonight an obstructive lesion of the naso-pharynx, which the speaker had not noted. The cough and the lesions in the chest and posterior commissure seemed to the speaker to suggest an incipient laryngeal tuberculosis. The patient was anxious to have the advice and opinion of the gentlemen present. He had recommended a limited course of local treatment to the nose and throat and then a proper climatic change.

Case II. A young man, 20 years of age, who had presented himself at the clinic for treatment the week previous, complaining of his throat, and said that his nose was becoming stopped up. There was no pain, and no nose-bleed, but there was a large mass of obstructing tumor in the right nostril. It was not attached to the septum, but whether it was attached to middle or the inferior turbinate had not yet been determined. The doctor had refrained from having any microscopic examination made in order that the case might be discussed tonight. Afterward he would have the examination made and report the result. He was inclined to believe that it might be a sarcoma of the nose, which, however, was not unusual in a person of this age. He had seen five cases, and two of the patients were about the age of this young man. Several years ago he had collected reports of over 100 cases of sarcoma of the nose, many of them springing from the septum.

Dr. Harris wished to add that besides the symptoms which he had reported in the first case she had a very profuse expectoration.

DISCUSSION.

Dr. LEDERMAN said that he had observed quite a quantity of pus coming from the naso-pharynx of the young man, and the presence of adenoid tissue, suggesting Törnwald's disease. He thought that the naso-pharynx ought to be looked after before any diagnosis of a tubercular condition was made.

Dr. HUBBARD told of a patient whom he had seen some two years previously, in whom there was no cough, no fever, but these little rales which Dr. Harris described as not very distinct and not always

present. She was afterward found to have tuberculosis scattered all over the pleura, and eventually died of tubercular pleurisy. Thirty years before she had had a definite apical tuberculosis, which had entirely healed. He thought that the case which Dr. Harris presented might prove of a similar character.

Dr. SIMPSON said that he had seen the patient previously. He had given the case very careful study, had had several examinations of the sputum made by the Board of Health and likewise by private laboratories; and if he had had any idea that she would be here tonight, he would have brought down the reports of these examinations. The consensus of opinion from these various reports was that the patient had a very marked catarrhal bronchitis, no sign whatever of any tubercle bacilli, and no microscopical findings which would in any way point to tuberculosis. When she first presented herself to him three weeks ago, there was quite an inflammation at the base of the tongue, the result of recent cauterization made by another surgeon, and it was impossible to determine whether the reddened spaces and the superficial interarytenoid erosion were due to a pathological condition or to the cauterization which had been done previously. This condition had cleared up later, and the speaker thought that at present it amounted to nothing at all. The right cord varied. His first thought was that it was tubercular, but afterward he concluded that the lesion was practically the result of the cauterization. The expectoration was very excessive and thick and tenacious in quality, and at a first glance would be pronounced tuberculous. The patient had had some attacks of asthma, and he had finally concluded that it was not tuberculosis but that it was simply a severe case of bronchitis and asthma. He had examined the back of the nose, and found no more than an ordinary amount of secretion with slight enlargement of the third tonsil. The expectoration comes from the chest. The first day she presented herself it was a typical asthmatic condition.

Dr. QUINLAN said that he considered that the history of this patient suggested an indistinct tubercular diagnosis. In the first place the cough was constant and had not been overcome, she had a temperature, and showed evidence of some systemic invasion, the pulse running in the region of 100. Some infection was certainly at work, and it was his plan in such cases to be very watchful, in spite of the microscopic results and the statements of the patient, and to keep constantly in mind the subjective points of the case. The patient was of the type and peculiar build of womanhood which was especially liable to tuberculosis. The careful observation of such cases was of great educational value, and he hoped that this one would be reported again at the October meeting of the Section.

Dr. COFFIN said that he had examined the naso-pharynx of this case with some difficulty, that he had found a considerable mass of adenoid tissue in the vault and that there was pus flowing down over the posterior wall. He said he should expect to find about the condition she had in her larynx. He hoped that Dr. Harris would clean up the naso-pharynx and see if the atmosphere of tuberculosis did not disappear. It seemed to him that a patient in such a condition might be especially susceptible to any infectious invasion.

Dr. Coffin said that he had a feeling that adults frequently had adenoids or a thickening of the tissues at the vault of the pharynx that was liable to be overlooked, and that the best results were obtained by thoroughly cleaning out the naso-pharynx. He told of a case that had come to him lately from one of the best men in the profession. The patient had a most persistent cough. The doctor found a considerably thickened mass in the vault and removed it, and only this morning the patient reported that the cough was nearly gone. Yet this mass had been passed over by one of our best men, and he did not doubt that he had done the same thing himself in other instances.

Malformation of the Larynx and Exophthalmic Goitre due to Traumatism.

A. F. KOONTZ, M.D., had been prevented from attending and had asked Dr. Hurd to present the patient. Dr. Hurd stated that he had not a full history of the case, but that about 15 years ago the woman had fallen upon some steel instrument, which struck her in the throat and injured the cartilages. She became unconscious, was put to bed, and remained there for two weeks, and ever since her speech has been affected, as the gentlemen heard it now. The right thyroid cartilage seems to have been crushed and there is an anchylosis of th arytenoids. He had understood from Dr. Koontz that the exophthalmic goitre came on at the same time, but afterwards learned that this developed three years later, and possibly had nothing to do with the other trouble.

Dr. HUBBARD said that he very much regretted that they did not have a more complete history of this patient, especially in regard to her family history. In these cases of exophthalmic goitre there seemed to be an hereditary tendency to the allied diseases as migraine. In this instance, as the exophthalmic goitre came on so long after the injury, there seemed very little probability of there being any relation between the two conditions. In the patients that he had seen, the onset had been very rapid after the supposed cause had been established. Not much had been learned in regard to the etiology of the disease from the study of the chemistry and physi-

ology of the thyroid glands. The latest book that he had seen on the subject, by Richardson, of Baltimore, says: "From its origin and mode of evolution the thyroid is to be considered as associated with the respiratory gaseous exchange of the blood and tissues. The phenomena following its distribution by disease or experiment are to be interpreted as a disturbance of the gaseous metabolism, especially, with the mal-assimilation of oxygen by the body tissues, to which are correlated the subnormal temperature, twitchings, loss of fat, etc." That is very vague, but it is the best that we have so far. There have been many origins assigned to it, the latest being the gastro-intestinal tract. It was a question whether this case came under that category. If so, she ought to show improvement under gastro-intestinal antisepsis and proper feeding within a month. The patients that he had treated had improved within that time. While thyroid enlargement may be one of the symptoms of Basedow's disease, yet underlying it all, there is some other cause that has not yet been discovered, and this is why some cases improve under some lines of treatment, and others along other lines. He would like very much to hear a report from this case later on.

Dr. LEDERMAN said that aside from the exophthalmia in this case we know that fracture of the thyroid cartilage is an uncommon occurrence, and told of a case which had come under his own observation. A gentleman was seated in an open Broadway car and the car ran into the one ahead. The sudden shock threw the man from his seat against the seat in front. Two days later when he consulted Dr. Lederman he was suffering from aphonia and showed a distinct fracture of the thyroid cartilage (abnormal mobility and crepitation) and the only other manifestation was the edema of the aryteno-epiglottidean fold and the prominence of the false cord overriding the true. He was kept under treatment for about ten days, the throat being simply strapped with adhesive plaster, the outside being mobilized, and the man made a good recovery in a very short time.

Dr. WILSON said that the most recent thing he had seen on the subject of exophthalmic goitre was the statement that it was not due to the thyroid itself but to the para-thyroid glands. Just what these were he did not himself know, but the author stated that they were several glands very loosely connected with the thyroid, and that some time ago he had prepared an extract from the glands and had administered it in some six or eight cases, two of which were markedly benefited. He was inclined, however, to ascribe the benefit to the general improvement and the relief of some nervous symptoms which the patient had. This para-thyroid extract was worth $10.00 an ounce.

Unusual Case of Deformity of the Nostril Operated upon with Remarkably Satisfying Results.

Dr. F. J. QUINLAN presented the patient, a young lady who had applied to him for the correction of a very disfiguring deformity of the external nose. It was a congenital condition and the nostril when he first saw it was so prominent that the patient could put out her lip and touch it. The disfigurement was very great and attracted much attention in her native town and wherever she went. She said that sometimes the children would call after her, "Polly wants a cracker." She was so pleased and proud of the result of the treatment that she had consented to appear before them this evening in order that they might see it. He then drew a diagram illustrating the appearance when he first saw her, and said that he presented the case to show the possibilities of external surgery.

With the assistance of Dr. Bodine, the patient had been put under anæsthesia; and after an initial incision in the median region, the cut was carried laterally down to the level of the face. The structures were stripped down to the bone and the tissues were pushed away. A line was then drawn and ¾ of an inch of tissue was sawed right out. The difficulty then was to bring the two portions together. There were six layers of sutures used from the inner side of the nostril to keep the septum in position in the median line. The result was eminently satisfactory, and it was difficult to realize the difference in the appearance now and two months ago. It was almost a departure in the surgery of the external nostril. The scar, as you see, is trifling.

The healing was uneventful, and there was no pus. One point particularly he wished to emphasize. No bandages were put upon the wound. "We simply put in the sutures and put on a little aristol." The doctor said he thought that bandages frequently had a tendency to develop suppuration. When the sutures were taken out there was not a drop of pus present. He had undertaken this operation with considerable fear and hesitancy, but he certainly felt very well pleased with the result.

DISCUSSION.

Dr. COBURN inquired whether nasal splints were used, and also asked what kind of sutures were employed.

Dr. QUINLAN replied that chromicised catgut was used, and he wished to emphasize how much could be accomplished in these cases with absolute asepsis. Here was a case in which the deformity was so great as to make the young lady a laughing-stock, and it was surprising that so much tissue could be removed and leave her in such a good condition. The only difficulty encountered was to hold the

septum in the median line. The incision was made down to the cheek and was sutured with six layers of sutures. Previous to the main operation he had removed some posterior nasal growth, and had put the patient in position to secure better nasal respiration. He felt that we who were doing work on the inside of the nose, understanding the anatomy and physiology of this organ, should not be so ready to surrender work of this kind to the general surgeon.

Dr. HURD wished to know the extent of the incision and what instrument was used.

Dr. QUINLAN replied that the cut was made with a saw right at the junction of the triangular cartilage and carried down to the cheek and a V-shaped piece was taken out. Then the lower part was brought up to the other with properly adjusted sutures so as to relieve the tension.

Specimen of a Large Nasal Polypus.

Dr. NEWCOMB presented it on account of its large size. It had filled up the nostril of the patient, a man of 30 years, and had projected posteriorly into the naso-pharynx. On account of the peculiarity of the peduncle, two thicknesses had to be cut through before it was free, and it was then withdrawn with the forceps.

A New Hæmostatic Nasal Packing.

Dr. NEWCOMB said also that he wished to present to the Section a peculiar substance which the members of the profession in France had been using—a nasal hemostatic, called Penghawar. It looks like fine silky oakum. As a matter of fact it is a thready or fuzzy exudation from certain species of ferns which grow in the East Indies. It is used for packing, and as the secretions of the nose start up it loosens itself and comes away. The French find it very efficacious. The doctor said that he had been told that it had salts of iron in it, but none of the literature he had seen mentions that fact. It undoubtedly did contain some tannin, but most of those who had used it thought that it acted mechanically, as the fuzzy character allowed the blood to form on the filaments a sort of clot, the filaments being analagous to the threads of fibrin which form in an ordinary clot. He had not used it enough as yet to express a definite opinion on it.

Electrolytic Instruments for Treating Pachydermia Laryngis.

Dr. DELAVAN said that in connection with the case presented by Dr. Harris he would like to call attention to a couple of electrolytic instruments devised about ten years ago in London by Dr. Greville Macdonald for the removal of pachydermia laryngis. In his experience this affection was rather uncommon in this country though not

at all so in the harsh, changeable climate of London, where it was often met with especially in costermongers, who used their voices much in the open air, drank hard, and smoked. The relief of such conditions by tropical applications is very unpromising. The use of the instruments for the application of the electrolytic current to the posterior part of the larynx had been allowed with greater success than any other means. The instruments were exhibited, not because of their newness, but because they might suggest a method of treatment which has proved successful elsewhere. The treatment was simple. The needles were inserted into the substance of the thickened tissue and a weak current applied for as long a time as the patient was able to stand it. As a rule these patients are not very sensitive and with a little training and under local anæsthesia, applications could be successfully made. A number of sittings were required.

In his own hands the method has proved very satisfactory. He used a current of one to three milliamperes, according to the tolerance of the patient.

Paper: Report of the Garcia Centenary. By Dr. HARMON SMITH. *(To be published in full in a subsequent issue of* THE LARYNGOSCOPE.*)*

Dr. Smith also presented a translation of a letter from Manuel Garcia, thanking the Section for the Resolutions of Sympathy and Good Will which had been forwarded to him on this occasion.

CHICAGO LARYNGOLOGICAL AND OTOLOGICAL SOCIETY.

Regular Meeting, May 2, 1905.

WM. L. BALLENGER, M.D., *President.*

Report of Three Cases: I. Palatal Ulceration; II. Antrum Disease; III. Laryngeal Tuberculosis.

Dr. T. MELVILLE HARDIE: *Case I.* The patient is a man, aged 56 years, who has an extensive tubercular ulceration of the right side of the soft palate, with ulceration of the right tonsillar region, including both anterior and posterior pillars. There is an infiltration of the epiglottis, increasing with progress of the disease, but no ulceration of the larynx. The man suffers a great deal from pain on swallowing, and I have asked him to let you see him, not merely because of the clinical appearances of the case, but in the hope that he may be benefited by your advice as to treatment.

Case II. The next patient is a man from whom I removed a large sequestrum which involved the anterior wall, the floor, and inner wall of the antrum. I present the patient for the purpose of asking whether you advise my making an opening into the nose, removing a part of the turbinated body, and a part of the inner wall, and closing the outer wall; or whether you do not think it wise to still leave that open for purposes of observation. He is wearing a plate which conceals the defect. As it is now, the patient does not require any attention from his physician. In the event of closing the opening, I imagine some treatment would be required.

Case III. A man, 76 years of age with tuberculosis of the larynx. There are extensive infiltration and ulceration of the epiglottis, also a large ulceration of the posterior laryngeal wall. His wife died seven years ago from pulmonary tuberculosis, and he has lost three children from the same disease. They were all young adults. Tubercular ulceration of the larynx is unusual in a patient as old as this man.

DISCUSSION.

Dr. OTTO T. FREER: May I ask D. Hardie, in regard to his first patient, whether a histologic examination of the tissues underlying and about the ulcer in the soft palate has been made?

Dr. HARDIE: There has not.

Dr. FREER: Two years ago I saw a case of superficial ulceration of the mucosa over the hard palate extending into the velum. The

appearances strongly resembled those shown by Dr. Hardie's patient and tuberculosis was suspected as the probable condition; but the microscopic examination of excised pieces showed epithelioma of a superficial nature. It was in fact a case of rodent ulcer, similar to the form well known to dermatologists occurring in the face, where there is a very slow advance and where there is only a thin layer of carcinoma tissue penetrating the tissues, breaking down as soon as created. Such epitheliomatous ulcers are for a long time very superficial, gross neoplastic formation is absent and in the pharynx they much resemble ill-defined, ragged tubercular ulceration. It has been my fortune to see several such cases.

Without denying the probably tubercular nature of the ulcers shown tonight I wish to call attention to the frequent need of the microscopic examination of sections of tissue in the diagnosis of ulceration of the pharynx of equivocal aspect.

Dr. HARDIE: I should have said that the man's mother died at the age of forty of tuberculosis; the father at the age of sixty of carcinoma of the stomach.

Dr. FREER: While it is probably a tubercular ulcer, I would suggest the possibility of it being a combination of the two diseases—carcinoma and tuberculosis.

In regard to the second case, I did not gather a correct idea as to the nature of this sequestrum, or how it occurred.

Dr. HARDIE: The man was sent to me by his dentist, after having had three teeth fall out in succession. He had been under the care of his dentist for some months. He went to him because a tooth became loose and fell out. The dentist treated the tooth cavity, and it did not heal, and after a little while the next tooth became loose and fell out. He treated the case a little longer, shortly after which a third tooth fell out. He had been washing the cavity with peroxide of hydrogen or some other cleansing agent. One could not tell how far this necrosis had extended, or how many of the teeth would have finally fallen out if he had not had this piece of bone removed. It was uncovered as far as possible, and in removing it I took away a good part of the anterior wall and the floor of the antrum, back pretty nearly to the posterior wall of the antrum, when it was found to extend as far as the middle line in the hard palate.

Dr. FREER: Did the process seem to be osteomyelitic, purely inflammatory, or a dyscrasia practically?

Dr. HARDIE: Syphilitic.

Dr. FREER: As long as this man suffers no discomfort, if he were my patient, I should let him alone; but if food should lodge around the plate and cause annoyance, it might be well to do something.

Dr. HARDIE: The opening in front is closed practically. No food lodges around the plate. If there should, it could be washed away when the patient douched the cavity.

Dr. NORVAL H. PIERCE: I would like to ask Dr. Hardie if he has tried trichloracetic acid on these tubercular ulcers?

Dr. HARDIE: The only thing I have tried on them has been the X-Ray. The X-Ray has been applied twice a week for about six weeks, but without any noticeable effect. The exposures of the X-Rays were not very prolonged, because we wished to be certain of doing no harm. The patient himself said he had not noticed any difference in the amount of discomfort until after the last couple of treatments, when the condition seemed to be considerably worse, so far as pain was concerned. He has received orthoform locally. I have not used anything else on the ulcers, because I thought I should like to see the effect of the X-Rays on them, as we could get at them. We used a long tube to direct the rays on the ulcerated patch. I have seen very little difference in the appearance of the ulceration, excepting that before these agents were applied there were some small spots that looked like miliary tubercles, such as we not infrequently see in the pharynx.

Dr. J. HOLINGER: As to the treatment of the difficulty in swallowing in this case, as well as in cases of tubercular laryngitis, I had recently a very pleasant experience with a series of cases that I treated with a ten per cent. solution of chloretone. The preparation of the solution was the only disagreeable feature in this treatment; but the results have certainly been very gratifying, in that the patients can swallow any quantity of food without pain if the larynx is painted with this solution about an hour or an hour and a half before meals.

Dr. NORVAL H. PIERCE: In Killian's clinic, where a good deal of tuberculosis of the mucous membrane of the nose, pharynx, and larynx is seen, the use of the X-Ray has been abandoned entirely as absolutely valueless. I have seen a case of tuberculosis of the right posterior pillar heal under application of trichloracetic acid. I think trichloracetic acid in these regions, where we can apply it with safety, is of more value than lactic acid. I should think this would be a case where anesthesin would be indicated, although I have very little confidence in it myself.

Dr. HARDIE: I would like to ask Dr. Holinger what preparation of chloretone he uses, whether the crystals or the inhalant?

Dr. HOLINGER: I use ten per cent. solution of the crystals in olive oil.

Dr. HARDIE: In the matter of tuberculosis of the throat, most of us have had cases in which we have found one particular agent that

would always give relief; yet in using the same agent in another case we have been greatly disappointed. We know that a number of patients get well, so far as tuberculosis of the larynx is concerned, under the simplest treatment, and a number of others get worse under the most vigorous treatment.

Dr. FREER: I would suggest one thing I have used with success in a case of tuberculosis of the epiglottis, and that is the galvano-cautery used with a decidedly bright heat.

Dr. HARDIE: I have had cases of tubercular ulcers of the epiglottis get well under applications of nosophen powder and menthol in olive oil. I believe I used it ten or fifteen years ago; but I do not think I have used nosophen now for years. I recall one case in which the ulceration was very extensive. The man had not been able to swallow solids or fluids from the time he left Colorado Springs until he reached my office. He said that his thirst was even harder to bear than the pain. I introduced a tube into the stomach, and gave him a drink of cream and whiskey; the next day I curetted the ulceration of the epiglottis, and in about two weeks he was able to swallow beefsteak, and the ulceration healed. He died three years later of pulmonary tuberculosis; but there was no recurrence or further breaking down of the ulceration in the epiglottis.

In the case we have before us, the ulceration is very extensive, as a great part of the soft palate is involved. There is much ulceration in the right tonsillar region; both the anterior and posterior pillars are involved, and there is an increasingly large infiltration of the epiglottis. I felt justified in presenting this man in order, if possible, to get some useful advice from you.

Dr. O. J. STEIN: I would suggest the use of formalin in the case reported and exhibited by Dr. Hardie, as it is being used a great deal in cases of tuberculosis of the larynx, with considerable success, by Denver men and others. You can give as much as fifteen per cent. after anesthetizing the part; and the results are good, so far as subsidence of the symptoms is concerned. I think it would be well to try it in this case.

Dr. HARDIE: I used a 3 per cent. solution of formalin after anesthesia, with great discomfort.

An Improved Method of Making the First Incision through the Cartilage in the Resection Operation on the Nasal Septum; with the Exhibition of a Cartilage Knife Designed for this Purpose.

Dr. ELMER L. KENYON: Dr. O. T. Freer's work in perfecting the technique of the resection operation upon the nasal septum has been so thoroughly done that one does not feel over-confident in suggesting improvements. It seems to me, however, that the method

he pursues in making the first incision through the cartilage involves an essential and inherent weakness, in that it demands a degree of delicacy of manipulation on the part of the operator and a delicacy of the sense of touch, which, perhaps, most operators are unable to respond to. You are familiar with the manner in which this procedure is carried out. With a straight, very thin cartilage knife, held against the septum either vertically or at a more or less oblique angle, the operator moves it lightly backwards and forwards until it has penetrated the cartilage. He does this if possible with a finger in the concave naris, against which to work. The safety of the concave mucous membrane is dependent upon the delicacy of manipulation on the part of the operating hand, which, also, must interpret by a most keen sense of touch the instant when the cartilage has been completely penetrated; and, if the finger is in the concave naris, it is dependent upon the delicacy of the sense of touch of that finger as well. In cases where the finger can be placed in the concave naris, and where the cartilage is not unduly thick, this procedure is reasonably safe. On the other hand, if the finger can not be placed in the concave naris, or if the cartilage is unusually thick, it seems to me that only the most skilled operator can feel sufficient certainty in carrying out this procedure. Moreover, whether the conditions be difficult or easy, the concave perichondrium must necessarily be more or less injured. There is no way of making this sort of incision, as I see it, without injuring the concave perichondrium, and also more or less the concave mucous membrane. And furthermore, in a certain percentage of instances, the concave mucous membrane can not but be penetrated completely.

As to whether a keen, thin knife is capable of producing injury to the concave mucous membrane sufficient to be of consequence even where permanent perforation does not result, one of my cases throws some light. In that case, although permanent perforation did not result, profuse hemorrhage occurred into the concave naris on the second day following the operation. The patient was many miles away and came all the distance to see me with the nose bleeding freely. This case shows that injury to the concave mucous membrane, even where permanent perforation does not result, at any rate exceptionally, may be attended with consequences worth serious consideration. As to whether complete penetration of the concave mucous membrane by a thin, keen knife is capable of resulting in permanent perforation, one of my cases also throws light. In this case I was making the first incision through the cartilage with the Sajous knife, the blade of which is straight and very thin; I was experimenting upon an improved technique. Suddenly I felt the

knife give a lurch and knew that it had penetrated the concave mucous membrane. Looking into the concave naris I saw a little streak of dark on the surface of the mucous membrane, confirming my supposition that the knife had completely gone through. I was unaware of any further injury to this structure. A permanent perforation of about the size of a pea resulted. This case shows conclusively that complete penetration of the concave mucous membrane (possibly, however, with some concomitant injury) by a keen, thin-bladed knife may result, at least exceptionally, in permanent perforation.

Now if this step in the operation could be carried out without need for such a relatively extreme degree of education of the operator's hand, and if a very large part of the uncertainty attending the present procedure could be done away with, and, finally, if the step could be accomplished with scarcely any liability to injury of the concave perichondrium or mucous membrane; the technique of the resection operation would to that extent be advanced.

Fig. A.

The knife which I wish to present (Fig. A) partakes of these characteristics: The blade is made exceedingly thin, and of course the edges are keen; the blade is set on the handle at an angle of 30°; the upper and lower edges are each straight for a short distance and are parallel; the length of the blade is one-quarter of an inch; the blade is curved gently and gradually on the flat. The manner of using the knife is as follows: With the blade pointing away from the operator and with the concavity of the blade towards the convex side of the septum, the knife is placed against the cartilage, not vertically, or at a slightly oblique angle, but almost horizontally; then, with an upward and downward movement, and a pushing and lifting movement, the blade is made to penetrate the cartilage and to slip in between it and the perichondrium. One should bear in mind that in thus making the first entrance through the cartilage, he is working with the field of operation directly in front of his eye; he sees exactly what he is doing; his eye assists the sense of touch of his hand. The object of the lifting movement is this, that the instant the end of the knife has penetrated the cartilage, its farther edge at the place of penetration is lifted away from the perichondrium, and the operator sees the perichondrium through the opening. There is

no hesitating to make sure that the blade is completely through the cartilage, no strained dependence upon the sense of touch in order to be certain of avoiding penetration of the concave mucous membrane; on the other hand, one sees instantly when the knife has gone through. Consider the situation. The blade has penetrated the cartilage in that one place, and thus its extremity lies between the cartilage and perichondrium; the concavity of the knife is towards the cartilage. Now, in order to enlarge the incision, the blade is held firmly against the cartilage and moved upwards or downwards, the upper or lower edge cutting its path through the cartilage, and the extremity of the blade moving between the cartilage and the perichondrium. There is, I think, very little danger indeed of injury to the concave perichondrium or mucous membrane, for the reason that the curve of the blade is towards the cartilage and the pressure is in the same direction, so that, if the knife should slip, it must be the cartilage that is injured and not the perichondrium or mucous membrane. However, if dense adhesions were present, one would meet with difficulty, as he might meet with difficulty in the other procedure. In such cases I suppose that one should make a relatively small incision directly in front of the eye, and then with some form of separator dislodge the perichondrium from the cartilage above and below and complete the incision with a crooked knife. Since it is necessary to work with the blade away from the operator, both a right and a left knife are necessary, but the cost of the knife being no more than for a simple cartilage knife, the increase to the expense of the necessary outfit for the resection operation is not excessive.

DISCUSSION.

Dr. OTTO T. FREER: In designing his new cartilage knife for the first cut in the cartilage Dr. Kenyon has employed the proper principle of construction, that is his instrument has a keen very thin, razor-like blade, so that its use requires no pressure in order to make it cut. This is to be emphasized, for other instruments for the first cartilaginous cut are being recommended for use that are incorrectly made. For instance, Killian scratches through the cartilage of the septum with a thick-lipped, chisel-edged instrument, which must by reason of these qualities be necessarily pressed against the cartilage in order to wear its way through. Even the slight force thus required implies a stiffening of the fingers holding the instrument and so deprives the operator of the delicate sense of touch that is necessary to inform him when he has cut through to the under surface of the perichondrium on the concave side, a sense of touch which is preserved when one cuts through with a lightly held, keen-

edged knife. Others, who have operated under my direction, have expressed their surprise at the accuracy with which the tactile sense indicates by a sense of lessened resistance when the thin razor-like blade of my round-bladed knife has just gone through the cartilage without entering the mucosa-periosteum of the opposite naris. I no longer place the little finger in the latter in order to feel for the edge of the knife when making the first cut through the cartilage. In doing this, the finger presses the mucosa-perichondrium of the naris of the concavity against the edge of the knife and so favors its unwelcome division by the blade; holding the finger in the nostril also divides the operator's attention, and requires an awkward crossing of hands when one operates in the right naris unless one cuts with the usually unskillful left hand. Where no finger is inserted, the mucosa, by reason of its elasticity and frequently loose attachment on the concave side, is able in a sufficient degree to evade the cutting edge, to save its being incised if one cuts cautiously. Nevertheless I agree with Dr. Kenyon that the first cut in the cartilage, though it does not cause the experienced operator apprehension, is a source of dread to the one who has not educated his sense of the penetration of the knife into the cartilage; and it is possible that Dr. Kenyon's hollow blade will prove an aid to the unpracticed. Personally, of course, I feel like adhering to the methods I am used to, and I find that my sense of direction and penetration is most exact when I make the motions in cutting as simple and direct as possible, with a flat, thin, round-edged, straight blade without confusing curves. I cut straight through the cartilage vertically to its surface or at the most at an angle of 45 degrees, the edge of the knife looking towards the back of the nares. For those of moderate experience, it is well to cut through with several strokes of the knife, feeling from time to time, with the thin-edged dulled spatula elevator in the incision being made through the cartilage, whether at some point the latter has been divided all the way through, so that the blade of the spatula may be inserted under the posterior edge of the slit in the cartilage in order to lift it for seizure with the rat-toothed forceps. When this is done the operator can judge by sight what thickness of the cartilage he is cutting through. I have increased the extent of my first cut through the cartilage, my old incision, which follows the direction of the dorsum of the nose, being joined at the bottom of the septum by a short horizontal one, so that a tongue of cartilage is thus outlined with its apex forwards. When this is uplifted from the mucosa of the concavity, it gives so much room for further separation that I no longer find it necessary to watch the elevation of the mucous membrane of the concave side from the nostril of the concavity of the deflection.

Experience may prove Dr. Kenyon's knife a very useful addition to the instrumentarium of the window resection for certain cases. In fact there is so much variation from the usual in many of the deviations encountered that one is continually finding that some unusual instrument fits some unusual case, a reason for the multiplicity of my instruments.

I take this opportunity to refer to an instrument which I have recently described in Fraenkel's Archiv für Laryngologie. It is my modification of Grünwald's punch forceps (Fig. B) and a number of the members present have already seen it. Instead of the scissors handle of the original Grünwald forceps, my modification has a forceps handle which gives it great power, as the strength of the whole hand can be used in closing the blades. The latter instead of opening up and down as in the original instrument, open later-

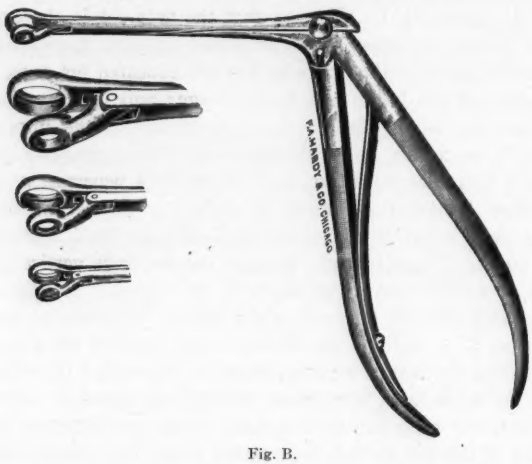


Fig. B.

ally, a direction suited to the position of the septum. In spite of the great power of the instrument none of the slenderness and length of the parts that enter the nose have been sacrificed. I have cut through bone ⅛ of an inch thick with the jaws of this forceps as easily as one can cut cartilage with other patterns, and it is possible with it to completely extirpate a bony deviation piece by piece. Even the strong *crista incisiva* may be trimmed off with it.

In contrast to it, the Hartman punch forceps, used by Killian, is far too weak to cut through much of the bone that I have encountered.

The Jansen-Middleton-Hajek punch forceps is able to cut heavy bone in the septum but can not be used with accuracy farther back in the naris than 1½ inches, because of the thick sockets of the blades which can not enter the naris and which hide the view as soon as they approach it closely. I have repeatedly had to excise portion of the vomer at a depth of from 2½ to 3 inches in the nasal cavity, measuring from the entrance of the nostril, and both Grünwald's original forceps and my modification of it easily reach the posterior border of the vomer.

Dr. KENYON (closing the discussion): I think we all feel inclined to concede to Dr. Freer an unusual skill in the performance of the steps connected with this operation. I have no doubt that Dr. Freer is capable by his own method of making this first incision with a degree of certainty possibly greater than that which I would feel even with the knife and method I have suggested tonight. The idea which I had in mind was to do away with the demand for an extreme delicacy of manipulative touch, which, I fear, can be sufficiently developed only through the performance of a great many operations. With the aid of this knife and particularly since in its use the eye is enabled to aid the hand, I believe this purpose to be accomplished. And if this be true, a real service has been performed for the great majority of operators.

So far as Dr. Freer's modification of the Grünwald forceps is concerned, I have used this instrument four or five times, and have found it of the utmost service in connection with the operation.

AMERICAN LARYNGOLOGICAL, RHINOLOGICAL AND OTOLOGICAL SOCIETY.

Tenth Annual Meeting, held in Chicago, Ill., May 30, 31 and June 1, 1904.

NORVAL H. PIERCE, M.D., *President.*

(Continued from June Number, page 512.)

SYMPOSIUM ON MALIGNANT GROWTHS OF THE UPPER AIR PASSAGES.

Malignant Growths of the Nose and Naso-Pharynx. By DR. FREDERIC C. COBB, Boston. *(Published in full in* THE LARYNGOSCOPE, *Vol. XIV., No. 8, page 577.)*

Malignant Growths of the Mouth and Pharynx. By DR. M. A. GOLDSTEIN, St. Louis, Mo. *(Published in full in* THE LARYNGOSCOPE, *Vol. XIV., No. 7, page 582.)*

A Brief Discussion of the Pathology of Malignant Growths of the Upper Air Passages. By DR. D. BRADEN KYLE, Philadelphia. *(Published in full in* THE LARYNGOSCOPE, *Vol. XIV., No. 7, page 619.)*

Primary Malignant Disease of the Larynx. By DR. CHEVALIER JACKSON, Pittsburg, Pa. *(Published in full in* THE LARYNGOSCOPE, *Vol. XIV., No. 8, page 590.)*

DISCUSSION.

Dr. A. LOGAN TURNER was asked to open the discussion. He said he had very little to say on the subject. It was a wide one and was open to a great deal of discussion. The discussion of malignant growths of the larynx alone would consume much time. Dr. Jackson, of course, was obliged to condense his paper in giving it, and there were many points which he was not able to put before the members. The speaker was more interested in Dr. Jackson's part of the subject because he wanted to hear what views were held on this side of the ocean with regard to the methods of operating on malignant disease of the larynx. In England the general trend of thought and action was towards the view of Sir Felix Semon and Butlin, namely, to resort to thyrotomy in intrinsic laryngeal cancer. If his reading was correct, on this side of the ocean the tendency was towards a wider removal of the disease, and that laryngectomy

was indicated and carried out more frequently, and, lastly, the operation of thyrotomy. The whole secret depended on early diagnosis, and unless one could diagnose cases of cancer of the larynx early, he could not do modified operations. He wished he had brought with him the latest statistics of Semon and Butlin on this point, but unfortunately he was unable to get them before leaving home.

Dr. C. R. HOLMES said there was one point that impressed him very forcibly, and that was, from his own experience he had learned that the microscope was not always to be relied on. He thought we were all apt to cut out a piece of tissue and submit it to some one who professed to do microscopic work, and that this individual to whom the section was sent frequently gave an opinion that did not correspond with the clinical diagnosis and clinical results. This had been his experience. He had in mind one typical case, that of a prominent business man of Cincinnati, who came to him, as a last resort, for consultation. He had been advised, after prolonged observation and treatment by a good man, to have his superior maxilla on the right side removed for a malignant growth. Upon examination the speaker was not convinced that the trouble was malignant. However, he removed a piece of the growth, sent it to a microscopist, and received a report that it was sarcoma. He doubted the correctness of this report. The man was about to be married. He denied a specific history. He believed the trouble to be specific, and put the man on anti-syphilitic treatment, and today he was perfectly well. This case was seen several years ago. The disease melted down promptly under antisyphilitic treatment.

In the case of a woman, about 35 years of age, a diagnosis was made of cancer of the larynx, involving the tonsils and base of the tongue. Surgeons were consulted, who advised the splitting of the jaw to remove a part of the larynx. Microscopical sections were submitted to two or three microscopists, and the disease pronounced malignant. Some said we might as well let the woman die. She was rather frail in physique. The speaker resorted to G. Betton Massey's method of electrolysis, and the case was now apparently well. There were still small remnants of the growth, but it had been reduced nine-tenths in size. Whether the findings of the microscopists were right or wrong, he was still in doubt. Had he followed the dictates of the microscopists a radical operation would have been made at that time. He saw this woman only a short time ago, and seemingly she was perfectly well, although it was about five years since he first treated her.

He thought Dr. Jackson took too firm a stand against nutrient enemata. Last year his mother, aged 74, died of obstruction from

cancer of the stomach. She received absolutely nothing but nutrient enemata for over two and a half months.

She would have the sensation of hunger at hours when the enema was due and it appeared practically as satisfying to her as an ordinary meal. She was well nourished and continued so almost to the last but there was such absolute occlusion that not a drop of water would pass through the stomach, and it was from thirst and finally general exhaustion, but not especially from lack of nutrition, that she died. He did not think one should take such a strong view against the efficacy of nutrient enemata as Dr. Jackson had done.

Orbital Infection from the Ethmoid Cells, with Spontaneous Opening at the Inner Angle of the Orbit. By DR. CARL L. MUNGER, New York. *(Published in full in* THE LARYNGOSCOPE, *Vol. XIV., No. 11, page 879.)*

DISCUSSION.

Dr. KNAPP thought the subject of orbital infection secondary to ethmoid disease was very important, as it was one of the most frequent complications of ethmoid disease. As far as he had been able to judge these complications could be divided into two classes. In the first class there was no perforation of the bony wall, while in the second class there was perforation of the bony wall. In the first class, usually cases of acute ethmoiditis, he had seen collateral edema of the orbit producing exophthalmos, with congestion of the eyebrows. In this class the symptoms were relieved by intranasal treatment of the ethmoiditis. The second class of cases, in which there was perforation, could be divided into the acute and chronic. The acute cases led to the formation of abscess which tended to perforate anteriorly, as in the case just reported. In the chronic cases an enormous abscess sac developed between the periosteum and the ethmoid labyrinth. The most serious complication he had seen following this had been sudden and complete blindness of the eye on the affected side, the ophthalmoscopic picture simulating that of embolism of the central retinal vessels, and the only way it could be explained was that it was an acute arteritis of the retinal vessels in the form of an embolism.

The treatment in the cases he had seen in which perforation had occurred, either in the acute or chronic form, had been a little more radical than that described by Dr. Munger. He did not think drainage alone was sufficient treatment for these cases because we were liable to have a relapse. A radical operation was indicated in most of them.

Dr. J. A. THOMPSON said that a confusing point in the diagnosis of these chronic cases was illustrated by a patient he saw four years ago in consultation with an oculist. He was asked to examine the patient after preparations had been made for the removal of an orbital tumor. The history was that when a child, three years of age, he had a severe case of scarlatina. From that time until he saw him, nineteen years later, he had never breathed through the corresponding nostrils. But no attention had been paid to this. The patient lived on a farm out in the country. When the ocular symptoms developed, he was brought to the hospital in the city and placed under the care of a colleague. The morning the speaker saw him the left eye was at an angle of 45 degrees. There was some conjunctivitis; some weeping from the corresponding eye, but no active inflammatory symptoms. Pressure over and around the orbit elicited a little expression of pain, and the feeling was that of a bony tumor. He was utterly unable in the nasal examination to pass a probe through the nose back to the naso-pharynx in any portion of it. There was some adhesion between the septum and structures of the outer wall, and no amount of cocaine or adrenalin could enable him to find the opening. He told the oculist who had the case in charge that he though it was one of ethmoid abscess that had pushed the orbital plate of the ethmoid in front of it. Arrangements had been made for operation. He went ahead and made a free opening into the nose. He found, when he entered the orbit, he was unable to get any pus until he perforated the bone, and then the discharge was free. The after results were a troublesome part of his operation. The operative wound would not close, and some two months later the case was brought to the speaker for intra-nasal operation, with the hope of getting the fistulous opening at the upper part of the orbit closed. He never undertook so hopeless a job. There was absolutely no landmark by which one could recognize the normal structures. All he could do was to go in and remove granulation tissue, with spicules of bone lying in it. To make a long story short, he made three operations before he succeeded in getting the nostril patulous and in securing a perfect cure. The eye returned to its normal condition, and the young man was able to breathe through the nostril, although there was an adhesion at one point.

Dr. T. PASSMORE BERENS thought the treatment of these cases could be summed up in three words—radical but careful. Unless one was radical in the removal of the ethmoid cells, the case would continue to suppurate, and one would get a condition described by Dr. Thompson.

Dr. MUNGER, in closing the discussion, said he had nothing to say except to remark that a radical operation in some of these cases was necessary. He did not think, however, it was indicated in his case. The patient got well, so that he saw no further occasion for operating.

Adenocarcinoma Occupying All of the Sinuses, Nose and Orbits—By DR. W. H. DUDLEY, Easton, Pa. (*Published in full in* THE LARYNGOSCOPE, *Vol. XIV., No. 9, page 714.*)

Cases Illustrating Difficulties in the Diagnosis of Mastoid Complications. By Dr. ARTHUR B. DUEL, New York City. (*Published in full in* THE LARYNGOSCOPE, *Vol. XV., No. 1, page 42.*)

Some Interesting Cases of Mastoiditis, with Remarks. By DR. JAS. F. MCCAW, Waterbury, Conn. (*Published in full in* THE LARYNGOSCOPE, *Vol. XIV., No. 7, page 520.*)

Diseases of the Salivary Ducts and Glands, and Their Treatment. By DR. ROBT. C. MYLES, New York. (*Published in ful in* THE LARYNGOSCOPE, *Vol. XIV., No. 12, page 916.*)

DISCUSSION.

Dr. GEORGE L. RICHARDS had had two cases. A man, a fish dealer, had an intermittent discharge from the right side of the mouth through the sublingual duct for some time, which became purulent and sero-purulent, after which swelling occurred, with involvement of the submaxillary gland. Patient stated to his physician that some years ago he stuck a piece of straw into the duct while cleaning his teeth. Everybody laughed at him, as no calculus could be felt. The condition of the patient became so serious and the swelling so great that Dr. Richards finally dissected out the submaxillary gland and in getting into the anterior part of the gland found a good sized calculus, and after sawing through the calculus found the offending straw. This was the nucleus around which the entire trouble originated. The removal of the calculus was followed by an entire cure. He never heard the patient say anything in regard to the very annoying lack of moisture in that side of the face. He asked Dr. Myles if the parotid still remained on that side, whether there would still be insufficient moisture in the mouth.

Dr. MYLES thought the man might have been depressed from long treatment and the dryness under the tongue might have affected him.

Dr. RICHARDS said that in the other case, in which there was swelling of the tongue, on probing he did not find any calculus, but on slitting the parts up along the line of a small director, and going about an inch and a half downward, he found a calculus, removed it, and healing occurred.

A Note on the Uses of Rubber in the Treatment of Nasal and Antral Diseases. By DR. PRICE BROWN, Toronto, Ont. (*Published in full in* THE LARYNGOSCOPE, *Vol. XIV., No. 12, page 923.*)

DISCUSSION.

Dr. GEORGE L. RICHARDS said, in regard to the treatment of antral empyema, he failed to see why one should drain through the mouth when he could do so underneath the inferior turbinal in these cases. In the cases spoken of by Dr. Brown, one could make an exploratory incision underneath the anterior end of the inferior turbinal; he could enlarge this with various sized curettes, and then take the second size of Dr. Myles' forceps and get a space of three-quarters of an inch, which would not close, and which would drain the antrum into the nose. By so doing, the patient was not subjected to the annoyance of a band of rubber against the teeth. He had found that this method gave rapid and permanent results.

Dr. ROBERT C. MYLES stated that for ten or fifteen years he had experimented with these different processes. He published several cuts of soft rubber tubes which he used for quite a while, but as time went on he found better methods. He had patients who for ten or twenty years had suffered from post-nasal catarrh, and they would never permit their antra to be closed up again. He had a patient who, for the last six or eight months, had washed out his antrum and ontinued to do so every time he washed his face. If one could get free drainage and the free admission of air, in many cases the antral conditions would get well of themselves without too much surgery.

Dr. JAMES E. LOGAN said, in regard to the rubber splint that Dr. Brown used in the operation for deflection of the nasal septum, it had been his practice to discontinue the use of any rubber (vulcanite) tube or apparatus upon the septum, for the reason that he found in these operations, when one corrected the deflection of the septum by whatever means he adopted, the natural inclination in the healing process was for the septum to return to its former deflected position. Constant pressure was needed more or less, and for that purpose he used a modified plug. If the plug was pressed, or a modification of the Simpson plug fitted the aperture which one wished to mould, the use of this compressed plug exercised

constant pressure which brought about success. It was much better than the use of something which was not so elastic, and caused nothing in the way of counter pressure which was exerted by the hard rubber or metallic splint.

Dr. PRICE-BROWN, in closing the discussion, said that he did not wish to emphasize this method of treatment above all others. As stated, the case he had was that of an old man too much debilitated to justify him in undertaking a more radical operation, and he thought the treatment he carried out was simpler. In all probability, one might have had more effective drainage by other means in the case he reported, but he did not expect his patient to recover; and succeeded in putting in a tube very easily for washing out purposes. The method of treatment was unusual and the result a cure.

With regard to the use of the splint, the benefit of it came from the constant pressure it produced. The reason Dr. Logan did not receive benefit from it in his cases was because he did not use it long enough. It did no injury. It produced no sepsis. It loosened because the septum became rigid and shrunk back from the splint. The septum, so far as his own case was concerned, remained in position without changing. The use of the splint was much better than the other methods he had tried.

Report of a Case of Acute Suppurative Otitis Media, Complicated by Double Pneumonia, Septic Thrombosis of the Jugular Bulb; Operation, Excision of the Internal Jugular; General Systemic Infection; Death. By DR. EDWARD B. DENCH, New York City. *(Published in full in* THE LARYNGOSCOPE, *Vol. XV., No. 1, page 37.)*

DISCUSSION.

Dr. KASPAR PISCHEL, of San Francisco, asked what Dr. Dench's experience had been with antistreptococcus serum in the treatment of these cases.

Dr. DENCH replied that this was the only case in which he had ever used the serum, and the result was not very good.

(To be Contenued.)

Error.

In the correspondence of Dr. Thomas Hubbard, published on p. 414 of the May issue of THE LARYNGOSCOPE, for "Baraton" read "Baratoux", and in the third line from the bottom, instead of "1889 *(Progrèss Médical)*" read "Sept. 5, 1885, *(Progrèss Médical.)*"